

Sportsman Pilot TM



Winter



1982



Sportsman Pilot



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NUMBER 4

ALL ARTICLES AND PICTURES BY JACK COX UNLESS OTHERWISE CREDITED.

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Mag Check

With this issue we are completing our first year of operation. **SPORTSMAN PILOT** has taken you from coast to coast in the past twelve months — from Sun 'N Fun in Florida to Watsonville in California. And in between, you've traveled, vicariously, to Langley Research Center in Virginia, the Waco Fly-In at Hamilton, Ohio, the Old South Fly-In at Tullahoma, TN, the EAA Fly-In at Marion, OH, and the Marana Fly-In in Arizona. You've sampled aviation museums at San Diego, Mesa and Tucson, AZ and Tullahoma, and you've visited homebuilt entrepreneurs in Los Angeles and Tempe, AZ. Finally, of course, you've met individual builders and restorers from all over the U.S. Every effort has been expended to make **SPORTSMAN PILOT** reflect a true picture of what is happening now, today in the wonderful world of sport aviation. **SPORTSMAN PILOT** is about YOU and what YOU are doing in your own area, at your local and regional fly-ins and in your own workshops.

I hope each of you has enjoyed our first year's efforts. It's been a lot of work — but even more fun for Golda and I, and we intend to do even better in the year ahead.

For those of you who are our "charter subscribers" (and have Volume 1, Number 1 locked up securely in your safe deposit boxes), some good news . . . and some bad news. The bad news first: your subscription runs out with this issue, so it's time to renew. The good news is that you are **not** going to be nicked for a price increase. Despite the recent postal increase, inflation, war, pestilence, famine and all the other excuses we **could** use to justify an increase, we are hanging in there for another year at \$7.50 . . . \$8.50 foreign. With inflation at 9% or so over the past year, just standing pat is the same as a price **decrease**. You don't get many of those deals these days, do you?

Renewal cards have been mailed to all you Charter Subscribers. We don't want to lose any of you, so please return them so you'll get our May issue on schedule.

KALEIDOSCOPE

BACK ISSUES, COLOR AND SUCH

By far the most frequent question we've received since starting **Sportsman Pilot** is, "When are you going to reprint Volume 1, Number 1?" We had about a thousand of you signed up when we published that initial issue, and about 1300 copies were ordered. The overage was mailed out, first come, first served, as we received new subscriptions until, at last, they were exhausted.

Reprinting is strictly a matter of numbers. All volume printing is priced on the basis of the number of copies ordered. We would have to order at least a thousand reprints to get the price per copy to a reasonable level. Also, we cannot use our Second Class Mailing Permit to send reprints of any issue, so postage would be expensive. We've started a file of names of those of you who have indicated a desire to have a Volume 1, Number 1 (and subsequent issues), so when it appears we have about a thousand, we'll place a notice here so you can order.

Also, a few of you have asked when we plan to start using color photographs. Again, it's just a matter of numbers. We have a schedule of improvements we will incorporate as we reach various subscription levels and color is next on the list. That's why, from the beginning, we have been using expensive 70 pound enameled paper . . . for good color reproduction.

There are variables, of course. For example, if each of you get a friend to subscribe within the next month, you'll see color in the May issue . . . or if an advertiser springs for a color ad, we'll go to a color cover.

It's just a matter of time . . . and numbers.

ROUND THE WORLD RACE ON

You lucky readers who have Volume 1, Number 1 of **Sportsman Pilot** will recall reading about the growing list of

contenders to become the first to fly non-stop, non-refueled around the world — the last great "first" to be accomplished in an airplane. Of those mentioned in the article last May, Jerry Mullen's Phoenix (nee BD-2) has already flown and early in December broke Jim Bede's old closed course marks; and Quickie Aircraft's Big Bird was being prepared for first flight as this item was being written. It may already be in the record books as you are reading this.

At the end of 1981, Dick Rutan had begun building his big twin engined Voyager . . . and rumors of two more projects had surfaced. One was a craft being built in New York State (no details) and still another in the Los Angeles area. The latter is really wild — a big Kasper Wing powered by a Palmer Dyna Cam engine!

Stay tuned!

WORLD WAR I AEROPLANES

World War I Aeroplanes is a unique publication for all of you who have an interest in the flying machines of what our grandfathers thought would be "the war to end all wars". Edited and published five times a year by Leonard Opdycke, **WWI Aeroplanes** is essentially historical in content — but always with the technical data necessary to construct accurate replicas. It's printed on heavy enameled paper, with lots of photos and really good drawings of the old birds. There's lots of info on the pre-1920 engines and occasionally on pre-World War I aircraft — like the Demoiselle. The readers of this publication are dedicated, hard core enthusiasts who want to delve deeply into their favorite phase of aviation. There is no subscription fee or price for **World War I Aeroplanes**. Leonard simply asks for donations from his readers . . . and for quite a few years now they have kept the publication going — and improving. If you want to join this exclusive, dedicated group, write Leonard E. Opdycke, 15 Crescent Rd., Poughkeepsie, NY

12601 and ask that he put you on his mailing list. It's highly recommended by **Sportsman Pilot**.

12 MONTH RANGE!

NASA is asking for design proposals on a solar powered, prop driven, remotely piloted aircraft with an endurance of . . . gasp! . . . 12 months! A typical mission would be a 12 month cruise at 82,500 feet with a 495 pound payload of instruments to monitor moisture exchange between the troposphere and stratosphere in a band 20° north and south of the equator. Proposals were due at Langley Research Center early last month. One of the biggest technical problems is the propeller. To remain efficient at 82,000 feet, it probably will have to increase in **diameter** as the plane goes up.

We like to see this kind of research — particularly involving propellers — because there may be spin-offs we can use in our sportplanes.

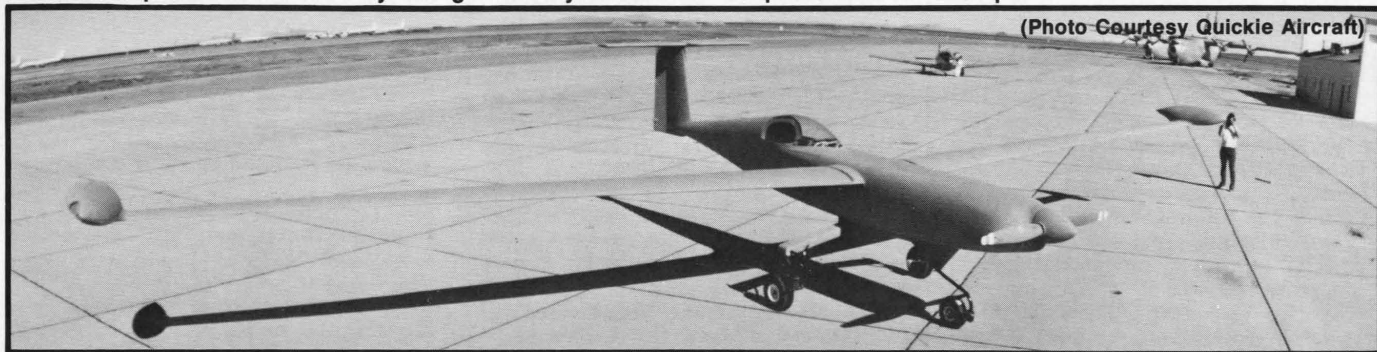
AUSTRALIAN ANTIQUES

As we learned last summer when the Australians chartered a 747 to get to Oshkosh — along with a batch of their sportplanes — they like to do things in a big way. Another example is the fact that a full-scale, flyable replica of the Fokker trimotor Southern Cross is currently under construction. The original Southern Cross still exists, displayed in its own glass enclosure, but is a national treasure valued on about the same level of esteem we in the U.S. accord Lindbergh's Spirit of St. Louis. It could never be flown again — so The Southern Cross Museum Trust was formed in 1980 to build a flyable replica. Work was started soon afterward and the plane is expected to be completed next month (March 1982). The most difficult job was the enormous one-piece, all-wood, full cantilever wing (almost 80 ft. span). The woodworking techniques needed to build the laminated spars were virtually a lost art — but the Fokker company saved the day by sending two retired craftsmen out from Holland to assist in the project. The original Southern Cross was the first airplane to fly across the Pacific from the U.S. to Australia.

Quickie Aircraft's Big Bird on the ramp at Mojave. Span is 52 feet and the fuselage is 25 feet long. The wings and almost half the fuselage carry fuel — up to 550 gallons. The current engine is a 4-cylinder turbocharged Franklin (the production version of the Sport Four) that has been prepared by Revmaster. A special version of the Lycoming O-235 may be sub-

stituted before record flights are attempted. The tricycle dolly drops away after take-off. Quickie president Tom Jewett plans to fly Big Bird around the world non-stop, non-refueled this Spring. An Omega nav system will be employed, plus an autopilot with sleep alarm. Big Bird will cruise at 24,000 ft. at speeds of 175 to 220 mph.

(Photo Courtesy Quickie Aircraft)



Charles Kingsford-Smith was the pilot. He later flew the American made F-7-3M around the world.

A number of other interesting restoration projects are under way Down Under. A Lockheed 10 and two Bell P-39 Airacobras are being restored and a DC-2 may be put in shape in time for the 50th anniversary of the 1934 MacRobertson Air Race in which a KLM DC-2 took second place. The P-39s, incidentally, are two of 17 that were forced down by bad weather in 1942 on a ferry flight from Townsville to Port Moresby. They were recovered in 1972 and are being slowly restored — one by a museum and the other by a private individual. The P-39s were part of USAAF 35th and 36th Squadrons.

IN TRANSITION

Since our Fall 1981 issue, sport aviation has lost two creative spirits, John Chotia and George Mead. Both died in crashes of their own aircraft designs and the causes of both accidents remain unresolved as of this writing. John's accident likely will never be explained because it was witnessed at close range by scores of knowledgeable aviation people and not one can say with absolute certainty why the ultralight dived straight in. Aeroelasticity and resulting control reversal is the favored theory . . . but a theory it is likely to remain.

In George's case there were no witnesses with aviation backgrounds to see the PAT 1 crash into Chesapeake Bay. The wreckage was recovered and transported to NASA's Langley Research Center and will be studied as few accidents have been in years past. Two NASA employees died with George, so every possible incentive is there for NASA to conduct the most exhaustive of investigations.

We had known both young men from the days of their initial participation in sport aviation activity, so their loss is a personal blow. Our first thoughts go out to those they have left behind, their families and close friends . . . but we also have cause to reflect upon the fate of their life's work. Both were totally committed to their aeronautical endeavors and neither would have wanted to see their efforts die with them.

In John's case, a well established company with an intact management structure remains to continue producing the Weedhopper. His wife, Susan, assumed the presidency of the company.

For George's legacy, circumstances are more complex. Losing its president, Pug Piper, and chief engineer, George Mead, in a span of about 4 months is more than most fledgling companies could survive, but the doors have not been shut as yet. The PAT 1 was test flown by both Cessna and Beech and three NASA test pilots flew it the day before the accident. All reportedly were very favorably impressed by the airplane and have joined in the chorus of encouragement being directed at Piper's widow, Helen, and his partner in Piper Advanced Technology (PAT), Lea Griswold. The PAT 1 was too good an air-

plane to die with Pug and George, they're being told — too superior to existing production aircraft, too much attuned to today's economy to simply be forgotten.

The cause of the crash must be officially determined before any decisions are made, **Sportsman Pilot** has been told, but there is reason to believe the PAT 1 will not be abandoned.

As one of the few who had the opportunity to fly the PAT 1, however briefly, I join those who encourage its continued development.

NEW FRENCH ENGINE

Mudry Aviation, the French firm that builds the CAP 10 and 20 aerobatic jobs, is building the CAP X, described by one European magazine as "tomorrow's cheap two seater". Most interesting is its powerplant — an engine that could be described as a modernized C-85. It will be produced by Mudry Aviation — if the French government will provide the seed money to get the production line going.

NEW CHAMP/CITABRIA PARTS

Univair has announced FAA/PMA approval of their Aeronca/Champion/Citabria aluminum wing ribs, U2-1655 Bellville Taxi Spring and landing gear U-bolts. For further information, contact Univair Aircraft Corp., Rt. 3, Box 59, Aurora, CO 80011. 303/364-7661.

JAVELIN V-6

Dave Blanton tells us he will convert Ford's newly introduced V-6 engine for aircraft use. It will have a belt driven prop drive with a 2.04 to 1 reduction ratio. The V-6 will have to wait its turn, however, because Dave is just beginning dynamometer runs on the Ford Escort (4-cylinder, inline) engine. He hopes to be at Oshkosh this summer with one in a Cessna 150 and another on his portable dyno. His son is installing an Escort in his new Acro Sport II and may be there also.

Dave has recently come up with a new means of testing his auto conversions — airboats. He's been approached by so many airboat people who want to switch to auto engines that this market may well provide the volume he needs to recoup the twenty grand he has already invested in the three sizes of belt reduction units he has put in production. Dave has bought an airboat and plans to begin terrorizing the bullfrogs any day now!

FLYING WING RESTORATION

Ed Maloney's Planes of Fame museum, located at the Chino, CA airport, is looking for a building in which to restore its Northrop N-9M flying wing. A 40' x 50' (minimum) building in the LA basin is preferred. The aircraft is said to be the "last Model N-9M", in which case it is the one and only N-9MB. Four -9Ms were built in 1942-43 to provide flight research data and train pilots for Northrop's huge XB-35 flying wing bomber. They were roughly one-third scale versions of the XB-35 — with spans of 60 feet. The first three were single place and powered by two 275 hp Menascos driving pusher

props via drive shafts fitted with fluid drive couplers. The last one, the N-9MB, had a second seat and was powered by two 300 hp Franklins. Jack Northrop, himself, rode in it on occasion. It was painted yellow on the wing's top surface, blue on the bottom. Wouldn't it be fantastic to see this thing fly again! If any of you can help with the building, contact: Planes of Fame, 7000 Merrill Ave., Chino Airport, CA 91710.

A LEGEND FOR SALE

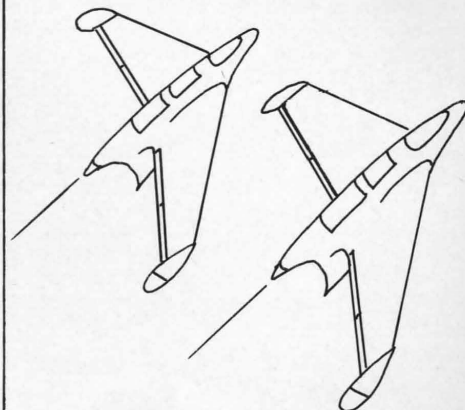
Psst! Hey, wanna buy a type certificate? Wanna own an airplane design . . . including the remaining parts inventory? Well, tell ya what I'm gonna do . . . if you want to own the rights to the Funk, call this number: 216/448-1981. Ask for the current owner, Thomas McClish. He wants to sell.

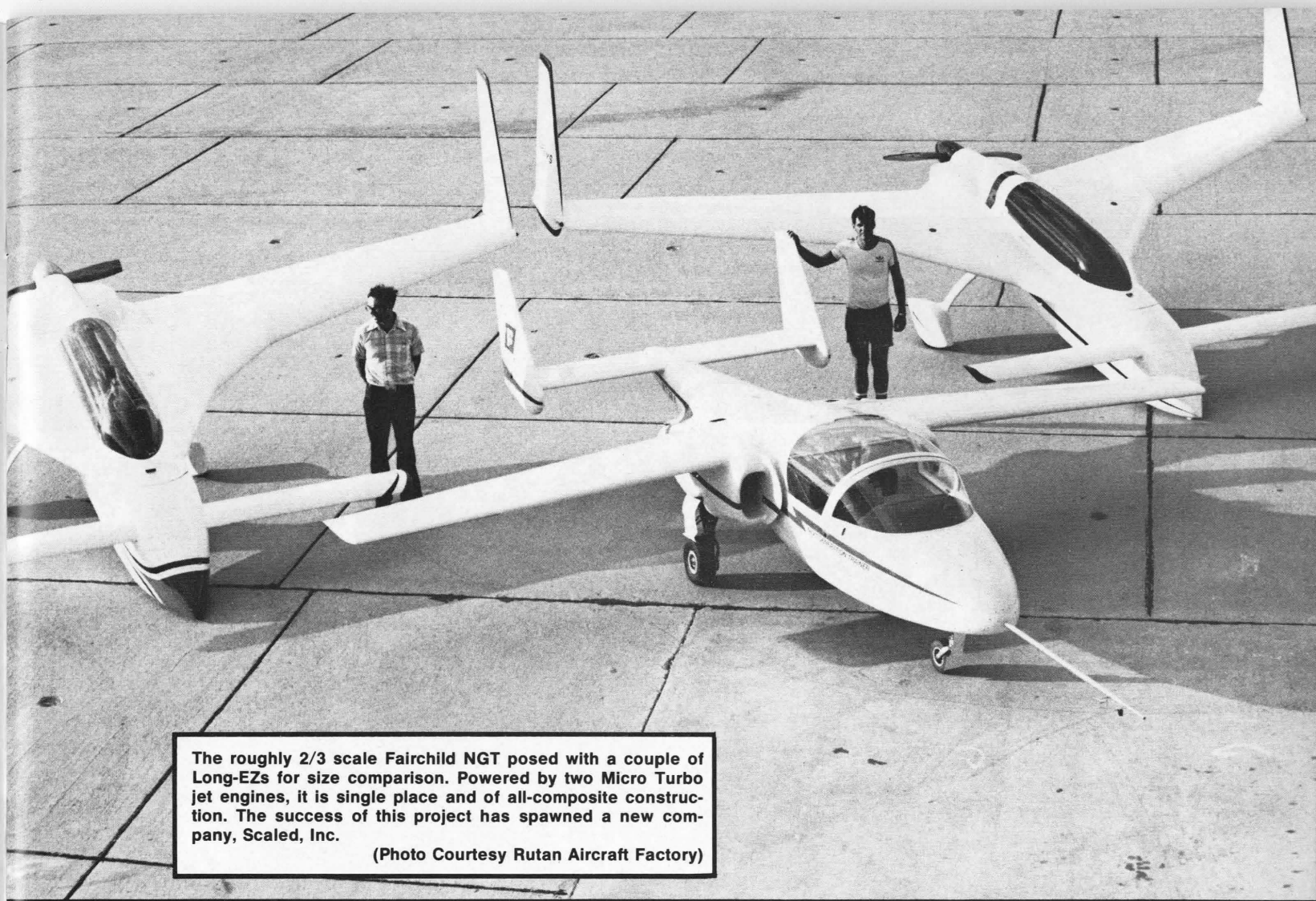
BOOK REVIEW - THE DELTA WING

As an aircraft designer, Alexander Lippisch was so far ahead of his time that only now are many of his concepts of the 1920s and 30s coming into regular use. Although widely recognized as the father of the delta wing configuration and as the designer of the world's first rocket fighter (Me. 163), his early work is largely unknown, even within the aviation community. Finally, a book has been published (in English) that fills the gaps in our knowledge of this brilliant engineer's life and work. Entitled **The Delta Wing: History and Development**, the profusely illustrated book was released in late January by Iowa State University Press, South State Ave., Ames, IA 50010. The price is \$15.95.

Of particular interest to sportsman pilots are Lippisch's tailless gliders and light powered aircraft of the 20s and early 30s. With minor styling changes, they would look right at home at Oshkosh today! His very first design, in fact, was a swept wing, tailless hang glider with endplate rudders that has an amazing resemblance to today's Icarus V/Fledgling/Kasper Wing group . . . but it flew in 1921! Some of his 1933 design concepts (see accompanying drawing) are still years in the future.

For a rude . . . but very enlightening . . . awakening as to just how far ahead of the rest of the world the Germans really were at the beginning of World War II . . . and why . . . **Sportsman Pilot** highly recommends **The Delta Wing**.





The roughly 2/3 scale Fairchild NGT posed with a couple of Long-EZs for size comparison. Powered by two Micro Turbo jet engines, it is single place and of all-composite construction. The success of this project has spawned a new company, Scaled, Inc.

(Photo Courtesy Rutan Aircraft Factory)

RUTAN REVELATIONS

Since he put the Long-EZ on the homebuilt market a couple of years ago, Burt Rutan has been heavily involved in all sorts of interesting projects — but has not introduced a new homebuilt. That is about to change. His entry in the Soaring Society of America's homebuilt sailplane contest should be making its first flight as you are reading this . . . and another super secret job may already have flown.

All we are at liberty to tell you about the sailplane at this point is that it is single place and is motorized. It is self-launchable and the engine can be shut down in flight for soaring and restarted to seek out new thermals or to return home. Its 17 hp engine is fixed within the airframe but has a retractable propeller. As to type of construction and configuration — what would you expect from Burt Rutan?

The big news around RAF in recent months has been the flight test program on the 62% scale version of Fairchild's entry in the Air Force's Next Generation Trainer (NGT) competition. Much is at stake here because the NGT chosen will replace the venerable Cessna T-37, resulting in a production run that may

well extend into the 21st Century.

The Fairchild NGT was scaled down by RAF, built by the Ames Industrial Corporation and put through a test flight program by RAF, being flown principally by Burt, Dick Rutan and Mike Melvill. The entire program took just 7 months! RAF did the test flight program in 2 months, including several weeks to install test equipment. The result was a 250 page report that included over 73 cross plots of stability and control data. So impressed was Fairchild that they asked Burt to be a part of their formal presentation in the NGT competition in early December. A decision on the winner is expected in March or April.

Regardless of the outcome, the concept of building scaled down versions of new designs and flight testing them has become a sensation in the aviation industry — largely because of the millions that can be saved. Burt's moldless composite airframes are dirt cheap by big airplane company standards and his small but highly skilled team can produce test results in weeks that would take most companies or the government years to duplicate. RAF has been contacted by almost every aircraft and aerospace manufacturer you have ever heard of — all the biggies — and the result is the formation by Rutan Aircraft Factory and the Ames Industrial Corporation (and its parent, Micro Turbo of

France) of a new company named Scaled, Inc. Its purpose will be to build more scaled down, manned test flight vehicles for the aircraft industry — from RPVs to air liners and jet fighters — and put them through flight test programs. Everything from weapons delivery to spinning will be investigated.

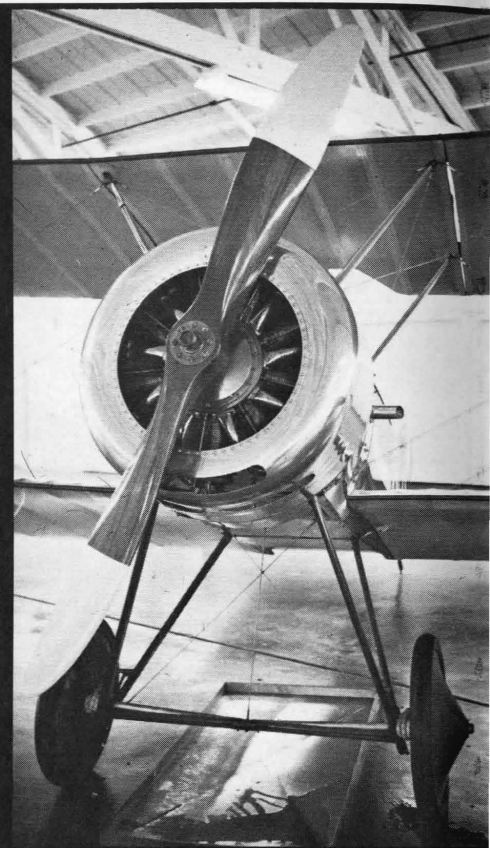
Early this year a new building will go up right beside RAF's facility on the Mojave, CA airport. And right behind it will go another building to house Ames, which is moving west from Long Island.

Obviously, some big things are in motion at Mojave . . . but since most of what we have been discussing has involved the military and air line industry, you may wonder why they are getting ink in a sport aviation magazine. Well, Burt Rutan tells me he is **not** abandoning the homebuilt market. On the contrary, the military and industrial work will simply provide him with the resources to do a lot of things for homebuilders (and general aviation) he might not have otherwise been able to do. The new firm, for instance, will have the latest equipment for computer design analysis — which Burt will be able to use on new homebuilt concepts. There are wild and wonderful things buzzing 'round in his brain for us sport pilots — so let's hope Scaled, Inc. is a rip-roarin' success, so we'll get to fly 'em one of these days. ☺

CHAMPLIN Fighter Museum



A beautiful Albatros D Va.



The almost delicate Sopwith Pup.

If you keep up with current aviation magazines and books, you are familiar with the name of veteran writer/photographer/editor Don Dwiggins. A native, mind you, of Hollywood, he has been a part of the U.S. aviation scene since the 1930s. Among his many exploits, Don pulled a tour with the RAF during World War II . . . in Mesa, Arizona! He was, you see, an instructor of British cadets at Falcon Field and fondly remembers the two big wooden hangars that housed the training planes . . . and the Cushman motor scooter he rode to and from work each day in that time of strict gasoline rationing.

Don, of course, is still at his type-writer . . . and, rather surprisingly, those old British hangars are still there on Falcon Field. By some fortuitous turn of the wheel of fortune, they have survived to be restored to pristine condition and to house a unique enterprise known as the Champlin Fighter Museum.

Doug Champlin, formerly of Enid, Oklahoma, is the man behind the museum. He's the sportsman pilot who had the conviction and resources to put the legendary Great Lakes biplane back into production a few years ago (since sold to interests in Georgia) and has been an avid collector of fighter aircraft for over a decade. The Champlin Fighter

Museum is the end . . . and ongoing . . . result of Doug's erstwhile "hobby".

You enter the museum through an imposing facade that from some angles resembles the thrusting prow of a man-o-war . . . into a lobby/display area. In its far end glass cases highlight aircraft models, old instruments and assorted other artifacts of military aviation's recent and not so recent past. Large aviation posters are displayed in swinging door frames for your purusal . . . and purchase.

Buying your ticket — \$3.50 for adults when we were there last fall — you proceed into the next area. Here, the walls are used to display a superb collection of paintings — all combat scenes from World War II and all by the same artist, Tony Weddel. The very first one encountered is a truly dramatic rendering of two Mosquitos thundering in over the blazing rooftops of a ravished city . . . "somewhere deep in enemy territory", as the old pulp magazines would have intoned. I would have readily plunked down some cash for a print of that one but, alas, it wasn't available.

On the floor of this room are a number of freestanding forms upon which are mounted a large collection — over 500 the museum brochure claims — of autographed photos of fighter aces of

15 nations, from World War I through Viet Nam. I must be getting old — many looked so young and the Europeans in particular, so thin. That fighter piloting is a young man's game is the inescapable message of these picture boards.

Ah well, I still **think** young, so undismayed, we moved on through a doorway and into a hall where we were abruptly faced with a decision. Through a door at the right end of the hall, according to a sign, we could direct ourselves to the World War II aircraft; through a door to the left to the World War I planes. We intended to see both so, since it was closer, we headed for the World War II hangar.

Out through a fully enclosed walkway we marched, shortly to enter the first of the British hangars. I smiled to myself thinking of a young Don Dwiggins put-putting up on his Cushman and strolling in this very building to begin another day of instructing his Limey cadets. I'll bet he was skinny in those days, too.

There were two airplanes in particular I had come to the Champlin Fighter Museum to see — the Daimler Benz powered Messerschmitt and the Focke Wulf 190 D-12. Most of us have seen the Merlin powered 109s (HA 1112) imported after the filming of **Battle of Britain** (EAA has one, of course), but



P-47D



The prize of the Champlin collection, a Focke Wulf FW 190 D-12.

they don't, indeed **cannot**, look right without the Daimler Benz. The thing that impresses you about the 109 when you see it sitting in close quarters with its contemporaries — a P-40N on one side and a big F2G-1 Corsair just across the center aisle — is how small it is. I don't mean span and length in feet, I mean the slenderness of the fuselage and wings compared to the others. It was about the minimum airframe that could be attached to the aft end of the Daimler Benz.

And across the way was the Focke Wulf. I always wanted to see a real live Focke Wulf. The early A models are my favorites, but the Jumo powered D-12 would certainly do as a substitute. The A model is, in my opinion, one of the most perfectly **proportioned** fighters ever conceived. It's like a Luger pistol; it's too brutally functional in appearance for me to consider it beautiful — a Spitfire is **beautiful** — but the A is beautifully **proportioned**. The D-12 has a kind of functional grace that I find appealing, also — marred only by its grotesquely large intake scoop. I was particularly impressed with the incredibly wide bladed propeller. Somehow, all the pictures I've seen of Focke Wulf props didn't do the blades justice. I'd sure like to hear a layman's translation of the aerodynamic rationale for those paddle blades.

Both the Focke Wulf and the 109, incidentally, are the only flyable examples of their type left.

The other World War II types on display were a P-40, Hellcat, Wildcat, P-51D, T-6, the Corsair I've already mentioned, plus a FG-1D and a razorback P-47D Thunderbolt that had been returned from the paint shop the very morning of the day we arrived. All the aircraft, and the hangar, are in spotless condition. The inside of the hangar (both of them) is painted white, which does wonders for illuminating the airplanes. An added touch of nostalgia was the music on the PA system — Glenn Miller, Tommy Dorsey, etc., from the 1940s. According to the museum brochure we picked up with our tickets, a Spitfire and a French Dewoitine 514 are to be added to the collection in the coming months.

After "just one more" photograph of the Focke Wulf, we trooped out through the entrance tunnels and over into the World War I hangar. Here, we were pleased to see several familiar ol' birds — the Fokker D-VIII that used to be on display in the EAA Museum, Ray Cocking's Thomas-Morse Scout we watched slowly go together — from one year to the next — at the old Corona and Chino, CA fly-ins, Jim Ricklef's beautiful little Sopwith Pup we saw fly at Watsonville

in the early '70s — all purchased by Doug Champlin for the Fighter Museum and now lovingly preserved. In addition, we were treated to the sight of a Fokker Triplane, the magnificent Albatross built by Jim and Zona Appleby at their shop at FlaBob Airport, a Nieuport 27 and the almost bizarre Aviatik D-1. The far end (from the entrance) of this hangar has a temporary wall that fences off the restoration shop. Windows have been thoughtfully provided so one can watch artisans at work on the Spitfire and a Fokker D-VII, the fuselage of which was in the museum area the day we were there.

The Champlin Fighter Museum is a "must see" anytime you are in the Phoenix area . . . and Doug tells us to be certain to come back often because new fighters will be added as he can obtain them. His goal, he says, is to assemble the finest, most comprehensive collection of fighters in the world.

He's off to a darn good start already.

And, sportsman pilots, **finally** a museum of this stature is located on a general aviation airport so we can fly in to see it. Falcon Field is, in fact, a good place to temporarily base if you are visiting greater Phoenix. It has a tower (124.6) that operates from 0600 to 2100.



PAUL CASTINE'S



Paul Castine

PIETENPOL

As a young man in Redding, Massachusetts, Paul Castine was one of literally hundreds . . . maybe thousands . . . who spent hours gazing at those old Douglas Rolfe paintings of the Pietenpol Air Camper diving out of the clouds with streamlines flowing from the wing tips and the top of the rudder — the artist's way of showing speed. "Build it from wood you can pick up at your local lumber yard," the ads promised, "and power it with a Model A Ford motor you can pick up at the local junkyard for next to nothing!"

Paul sent for the plans and actually began work on his dream plane . . . but quickly found there was a little more to the task than the magazines and maybe his enthusiasm had led him to believe. The project was abandoned, but Paul never gave up on his plan to someday complete a Pietenpol. He grew up, eventually learned to fly and in the late 1950s became a pilot for Aramco in Saudi Arabia. He was there for 7 years flying pipeline patrol in Navions and later working his way up through C-45s and C-47s. Returning to the U.S. in 1965, he settled in Phoenix . . . and began to dream about the Pietenpol once again.

In 1972 Paul decided it was time to

stop dreaming and begin butchering spruce. He set to work and although it would take 7 years of part time, on again, off again effort, he saw the project through this time around. It was a different airplane, of course, but Paul says he always felt he was simply finishing something he had started a long time ago.

Builders put every kind of engine imaginable in Pietenpols, but there was **never** any question concerning what would be hung on the nose of Paul's Piet — it **had** to be a Model A! He picked up a 1929 model and spent quite a bit of time overhauling it. The Model A is normally rated at 40 horsepower, but Paul fitted his with an aluminum head. With the higher compression it provides, the power is supposed to be upped to 52 stampeding hosses. Forrest Lovley, who has been known to mess around with Pietenpols a bit, made the radiator in his shop in Minneapolis.

The airframe was right off Bernie Pietenpol's plans, with two exceptions. Experienced Pietenpol drivers advised him to add jury struts . . . which he did . . . and a tailwheel replaced the original skid. Paul also used balloon tires, but that's really not out of character for the air-

plane. The skinny little wire wheels were replaced with balloon tires by builders in the early 30s, as soon as they came on the market.

All the nice wood work was hidden with a cover job of dacron fabric. The airplane was painted a light yellow and trimmed in green, resulting in a clean looking airplane with a look of the 30s.

Paul test flew his Air Camper in 1979. It was his first flight in a Pietenpol and he was expecting it to use a lot of runway getting airborne behind the Model A. Much to his surprise, the darn thing was off practically by the time he got the throttle fully open . . . and climbed out strongly. Two years later, he is still amazed at how well and how reliably the Model A performs. It had given no problems whatever in the 60 or so hours it had been flown as of the Marana Fly-In in mid-October of last year.

The airplane flies nicely, Paul says, and is easy to land. It does not have brakes and can be a little squirrely on pavement if he's rolling out in a gusty crosswind, but that is to be expected.

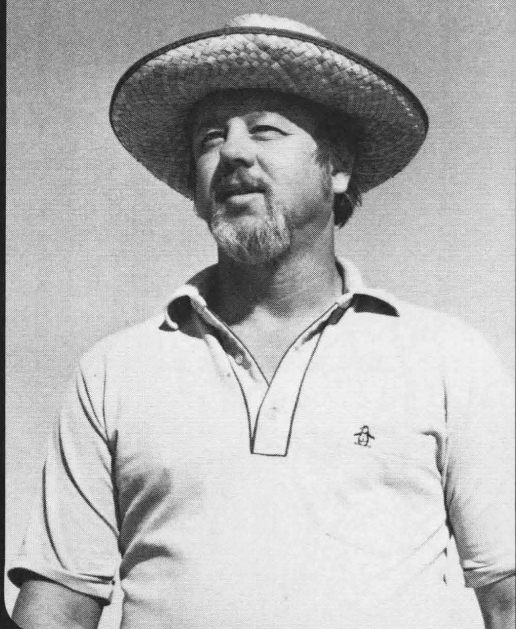
It's a bit of a challenge that comes with the territory when a fellow is out there realizing his childhood dreams.



Copperstate Fly-In



Stan Loer, general chairman of the Marana Fly-In.



The flightline at Marana — through the cabane struts of Maynard Ingalls' magnificent Starduster Too. That's Picacho Peak on the horizon, a familiar Arizona landmark.



You don't see this at many EAA fly-ins — a new, unpainted DC-10 on take-off. The unusual is commonplace at Marana. (Photo by Golda Cox)

The Copperstate Fly-In? Must be in Montana — somewhere around Butte. That's where all those big copper mines are . . . aren't they?

Well, yes . . . and no. Copper **is** big in Montana, but they also mine a lot of it in, would you believe, Arizona! So much, in fact, that down there they call themselves, among other things, The Copper State. It sure is a well kept secret in the rest of the nation. Back here in Wisconsin, in the country's ice box, we think of Arizona in altogether different terms. It's SUN City, the Phoenix SUNS, Valley of the SUN . . . and I'm here to tell you, friends, that along about the end of January, the very mention of those words is enough to start a full blown stampede for Phoenix or Tucson!

So . . . the Copperstate Fly-In is, indeed, in Arizona — at Marana, Arizona, about 25 miles up I-10 from Tucson. The actual fly-in site is the Marana Air Park, an old World War II basic training field that was plunked down in the Sonoran Desert during the winter and spring of 1941-42. The event is sponsored by the Arizona Council of EAA Chapters, and 1981 was the tenth year it's been held.

Now, if you come flying into Marana, never having been there nor knowing anything about the place, your first look at the airport below is going to result in the double take of your year. You'll probably rack your brain around to get out of the traffic area so you can recheck your chart to be sure you haven't flown to the wrong airport!


Reassured, you'll head back in, land and sit there bug-eyed as you taxi up the ramp past the most bizarre collection

of aircraft you're likely to ever see on one airport. You'll rumble by row after row of airliners (yes, airliners!) — everything from ancient propeller jobs to brand new, as yet unpainted DC-10s. All sorts of company names and logos emblazon their flanks — some big names and some "Air this" or "Air that" you never heard of. And right in among them you'll see B-17s with unfamiliar noses replacing the military fenestration, big helicopters and other exotica. The first thing you're going to want to know when you shut down and climb out is what th' heck all those big birds are doing out here on this somewhat remote airport.


Well . . . uh . . . welcome to Marana Air Park, Evergreen Air Center, repossession alley and, maybe, just a whiff or two of cloak and dagger.

It all started on July 8, 1942 — that's when Marana Army Air Field was activated. During the course of the next 3 years, Marana would become the largest basic training facility in the world, graduating 9863 pilots. At peak periods, as many as 500 BT-13s were launched every day from the big triangular shaped airport! It all came to a screeching halt in September of 1945, however; that's when the base was deactivated.


Marana sat dormant until 1951 when the Korean war caused it to be reactivated as a contract training school . . . run by Darr Aero Tech. This time around, training was in T-6s and, later, T-28s and T-34s. In June of 1957 the facility was deactivated for the second time. On this occasion, however, a civilian operation moved in as the military moved out. Intermountain Aviation was the new tenant and offered mainte-



RV-3s were the most numerous homebuilt type at Marana.



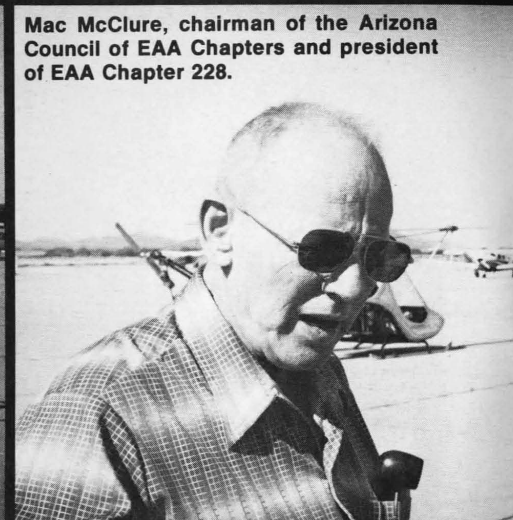
A really sharp little Piper Vagabond, owned by Paul Good of Phoenix.



A "Screaming Chickadee" (1946 Ercoupe) owned by J. B. Ward of Goodyear, AZ. The military paint scheme is no put-on. It is a replica of a YO-55, one of two Ercoupes evaluated by the USAAF in 1941.



A regular attraction at Marana — a prop driven bicycle.



Mac McClure, chairman of the Arizona Council of EAA Chapters and president of EAA Chapter 228.

nance, outside dry storage and "go anywhere, anytime" charter service. In the mid-1970s Intermountain sold out to Evergreen Air Center, an outfit that operates a vast fleet of helicopters and modifies air carrier aircraft — among other things.

Marana's relative isolation suffered a startling jolt in the early 70s when the TV networks named it as one of a number of airports around the U.S. harboring covert CIA operations. It was intriguing to sit there watching reporters trying to get in to interview Evergreen personnel knowing an EAA fly-in had been going on at Marana since 1972 — and an AAA fly-in before that! When you think about it, though, what better cover?

Glad to have been of help, Uncle Sam.

The airliners sitting all over the place are mute evidence of the hard economic times of late. Some are excess to the owner's current operational needs, some are the result of business failure and some are in for modification by Evergreen — usually from passenger to cargo configuration.

And right there on the opposite end of the gigantic concrete ramp from the airliners is the Copperstate Fly-In, including modern airplanes flown in for the event. It's the only fly-in of any size I'm aware of that is **entirely** on pavement . . . even the ultralights and RC models!

As are most regional events, Marana is a low keyed affair. The showplanes arrive on Friday afternoon and Saturday morning and the rest of the time is devoted to looking over everyone else's machines, hangar flying and some buddy

riding. The price of gasoline has cut down rather dramatically on local flying at every event I've attended in the past couple of years and Marana held true to form. Most of the air time was claimed by the ultralights — of which there were quite a number on hand. They were given their own pattern that did not overlap with the "real" airplanes — and it was a good thing. Right in the midst of Saturday afternoon's activity, a DC-10 went thundering out. (Somebody must have come up with enough money to release it from bondage!) The top award winner among ultralights was a modified Hummer built by Dave Brown of Laveen, Arizona. It was powered by a 2 cylinder Chapparral with a belt reduction unit driving a rather long propeller. The Super Hummer, as Dave calls it, had brakes, enough fuel capacity to bring about the need for a relief tube and a lot of instrumentation you don't normally find on ultralights.

Perhaps the high point of the weekend for homebuilt fans was when we all looked up to see a tight formation of, count 'em, seven RV-3s — led by Dick VanGrunsven in his prototype RV-4. The next time around, each plane peeled off in the finest military tradition to circle around for a landing. Really looked sharp! Dick and three of his builders had flown down from the Portland area to Bakersfield, CA where they picked up four more RV-3s for the flight over to Marana. Their eight (or seven RV-3s, if you want to be picky) represented the largest total of any single design — exceeding even the VariEzes. This was the first fly-in I've attended in about three years at which the Rutan canards were not the most

No, it's not a Monocoupe! It's a Rearwin Cloudster owned by John J. Sheble of Phoenix.

The VariEze line at Marana.

Patty and Maynard Ingalls of San Jose, CA with their highly modified, aerobatic and travelin' Starduster Too.

The top Warbird award went to George Pierce of Phoenix for this exceptional restoration of a Ryan PT-22.

Judged the best antique at Marana, this Spartan Executive is owned by Stan Kaurik of Tucson.

numerous. They were second, however, with six or so.

The RV-3, as most of you are aware, has been restricted by FAA from any aerobatic maneuvers — as a result of several accidents that involved inflight wing failures. At Marana Dick told us he had just completed static testing of an RV-3 airframe that verified his stress analysis figures. He has, of course, thoroughly investigated the RV-3 accidents and has found that in each instance the airplane was being operated well in excess of design limits at the instant of failure. Further, some were not built to the plans — or were somewhat poorly built. No one who knows Dick Van Grunsven really well has ever doubted the design integrity of his airplane. He is one of the most conscientious engineers in the business. The problem, it seems, is that the RV-3 is so clean and is so easy to jerk around, that some owners apparently just can't resist ignoring the maneuvering speed and redline . . . by a bunch. This is a problem with all aerobatic monoplanes including even the Stephens Akro, if they are not flown with good judgment. Unfortunately, every builder does not come imbued with the skill and experience of a Leo Loudenslager or Henry Haigh, so a modicum of prudence **better** be exercised.

You'll read about a number of the outstanding airplanes at Marana in some detail in separate articles in this issue, but not one of my favorites. In 1980 I wrote an article for **Sport Aviation** on Maynard Ingalls' magnificent, highly modified Starduster Too . . . but it was a year later at Marana that I finally had the pleasure of a ride in it. As I later told Maynard, I expected the Lycoming IO-540 (260 hp) powered bird

to get off quickly, climb like the proverbial homesick angel and cruise at a fast clip for a biplane . . . and I certainly wasn't disappointed. What I didn't expect was its impeccable manners. It has been my extreme good fortune to have flown most of the different types and models of light (and not so light) aircraft active today, but I have never had hold of one with more marvelously harmonized controls. Rudder, elevator and aileron are light, responsive and each feels just right in relation to the others. If you read my 1980 article on the airplane, you will recall that Maynard built another Starduster Too in preparation for building this one, using the first one as a test bed for working out all the modifications he planned for the "real" one. It certainly was worth the effort as N38PM is about as perfectly sorted out as an airplane can possibly be. I don't claim to be a hero test pilot, but based on what I like in an airplane, I couldn't find a fault with its handling. It's just a beautiful airplane that flies every bit as good as it looks.

Maynard and his wife, Patty, had flown down from San Jose with Dick Borg (Parakeet) and some other friends in a Grumman four-placer. It was a slow trip for the 'Too — and expensive with today's fuel prices. On the way home they planned to take full advantage of the powerful bird's capabilities . . . go high and let 'er rip!

Marana is a regional fly-in that does not have an air show. It is a day and a half event (Saturday and until about noon on Sunday), so few want to close down the airport for Saturday afternoon. Arizona EAAers have some excellent aerobatic



Those of you who go back to EAA's Rockford days will recall Merle Replogle and his controversial Gold Bug. This is his latest design, an all composite, VW powered, single place canard he calls the Gold Bee. It has a wing span of 18 feet and an empty weight of 540 pounds — way too much, Merle says. He's going to build a new, lighter version.



EAA is really going to the dogs! Bridget and Loki are owned by Frank Reddig of Phoenix.

Beautiful new Hiperbiplane by Harold Butties of Tucson. Powered by a 180 Lycoming.



shows each year — and this fall had the Masters contest at Falcon Field — so Marana can be devoted strictly to airplane admiring and togetherness. There was, nevertheless, a kind of an air show. The Tucson radio control modeler's club was on the program at 10:00 a.m. on Saturday to put their amazing little machines through their paces. I was an avid modeler during much of my misspent youth, but today's crop of balsa butchers has gone so far beyond the stick and tissue jobs I glued together that I would be insulting them to claim even a casual kinship. Furthermore, they are so skilled in flying their models that they don't leave me much bragging room as a pilot of "real" airplanes, either. I wonder how it would turn out if a Pitts were rigged up with radio control and one of these RC aces were matched up against a top aerobatic pilot in a similar aircraft? I would be awfully hesitant to put my paycheck on the line against the RC ace!

The most interesting models for me were the little jets powered by ducted fans. Interesting, because I still believe this (the ducted fans) is a development that will ultimately work its way up into our world of homebuilts. Engines are our eternal problem once we opt for something smaller than the Lycoming O-235, even though there are myriads of them out there on motorcycles, snowmobiles, pumps, power generation units, etc., etc. The problem in converting them for use in aircraft is that they develop rated power at too high a rpm. Free props of the size we'd like to use just don't like to turn that fast . . . they protest in the angriest and noisiest of ways,

often right up to destruction. Free props do their best work at a leisurely pace, twisted by big bore, slow turning engines. Put a short, multi-bladed fan on one of the little screamers, however, and enclose it in a circular duct with almost zero clearance between the two and the "bad" high rpms are right in their element — producing gobs of thrust without all the obnoxious tip noise.

The modelers can now buy beautiful little ducted fan units to bury in the fuselages of MIGs, F-86s, F-16s, etc., for very realistic "jet" operation. The ducts are usually a molded plastic of some sort that is tough enough to contain a fan turning as high as 14,000 rpm! It would seem that with the Kevlar, carbon fiber and whatnot that our composite airframe builders are working with today, it should be possible for someone to whip up a duct large enough to handle a fanned Cuyuna or a KFM 107 or one of those exquisite Japanese motorcycle engines. Sure, it will be complex and heavy . . . but so are belt reduction units; yes, it will be expensive . . . but so are a year's worth of propellers the typical ultralight pilot goes through.

The little Australian Hornet we saw at Oshkosh last summer powered by a Koenig engine driving a ducted fan is an example of what I'm talking about. One of these days someone will try it here.

The remainder of our time at Marana was spent interviewing pilots for the articles you will read elsewhere in this issue, taking pictures, etc. Then, on Saturday evening we joined the crowd at the excellent cafeteria conveniently lo-



A truly exceptional — and practical — replica of a Fokker D-VII. Built in 1977 by Gordon Gabbert of Dallas, it has been purchased by Woodson K. Woods for his Carefree Flying Museum (located just north of Phoenix on the Carefree Airport). Powered by a 200 hp Ranger, modified to run upright, the new/old bird cruises at 90 and lands at a sedate 35.



This Tomcat was one of quite a turn out of ultralights at Marana.

The most authentically finished Bellanca Cruisair we've seen in quite a while. Owned by Chuck Johanson of Albuquerque.



Note the unusual windshield treatment on this Stolp Starlet by Joe Thomas of Anaheim, CA. Powered by a Cont. 0-200.

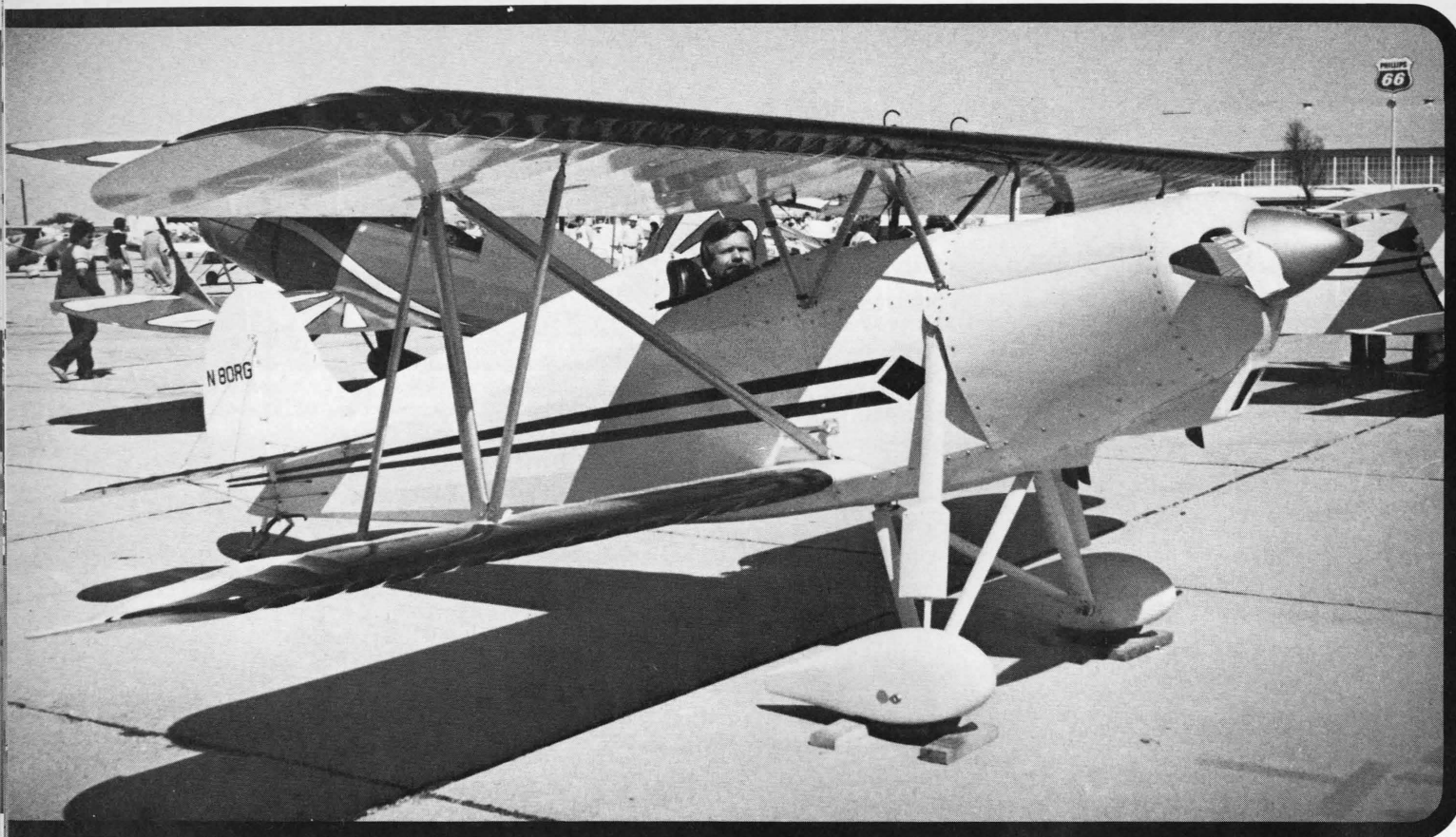
cated in what once was the mess hall of the air base. Afterwards, everyone assembled in another building nearby for the awards presentation. Tom Poberezny, EAA's executive vice president, was flying an Eagles air show in nearby Tucson that weekend and was able to drive over to Marana to speak briefly to the group and present the awards. The category winners, in addition to Dave Brown's ultralight we've already mentioned, were Classic — Cessna 180 restored by Doug Trager of Riverside, CA; Warbird — Ryan PT-22 owned by George Pierce of Phoenix; Antique — Spartan Executive owned by Stan Kaurik of Tucson; Rotorcraft — RotorWay Exec — B. J. Schramm, of course. The homebuilts were broken down into categories according to construction material. Best Metal Homebuilt was a Midget Mustang owned by Dee Stoddard of Mesa, Arizona; Best Composite was a VariEze owned by Gary Hertzler of Tempe, AZ; Best Tube and Fabric was Maynard and Patty Ingalls' Starduster Too I was raving about earlier; Best Wood was Paul Castine's Pietenpol that you'll read about elsewhere in this issue. And, finally, the Grand Champion of Marana '81 was Doug Trager's Cessna 180. Unfortunately, he had split for home late in the afternoon on Saturday, so was not there to receive his award — or get photographed and interviewed by **Sportsman Pilot**. Fame is fleeting, eh, Doug!

We were out bright and early on Sunday morning, but the fly-in was already rapidly winding down. Distance out west is something we Easterners have a little trouble adjusting to. It's a long way to anywhere else when you live in the

Desert Southwest, so folks have to head out early on Sunday. Dick Van Grunsven won the Furthest Distance award for flying down from Portland, OR, which is over 1300 highway miles. It's almost 400 miles to Los Angeles, twice that to San Francisco and another 400+ back east to Albuquerque . . . and a lot of sand and cactus in between. It's no wonder flying is as popular as it is in our western states because driving at the double nickel is hardly practical for weekend travel. Marana gets a lot of support from out of staters but even if it didn't there are enough sportplanes in the Phoenix/Tucson corridor to put on a good fly-in almost any weekend. I won't torment you fellow Easterners with stuff like the average number of sunny days per year, how many miles visibility is considered normal on just an ordinary day . . . except to emphasize the obvious: the military has utilized the area as a prime training site since the earliest days of flying because of the great flying weather. It's fantastic!

Stan Loer was the General Chairman of the 1981 Copperstate Fly-In and, along with his Assistant Chairman, Ray Backstrom, did a great job marshalling the forces in Arizona to pull off another highly successful event. The weather was sent directly down from Heaven — don't know how they managed that! — and everyone we talked to was having a great time. I don't know what the dates are for next year's event, but it usually is in mid-October. Marana is another of the sport aviation world's premier fly-ins, one you owe it to yourself to attend sometime. ☺

Richard Borg's



Rose Parakeet

On July 11, 1980 Richard Borg of San Jose, California realized a long held ambition by test flying his Continental C-85 powered Rose Parakeet replica. Everything went well so for the next couple of weeks, he flew and flew and flew in order to get the restrictions lifted by month's end. Right on schedule — thanks to some good California weather — he completed his test program and had the airplane signed off on July 30. On August 2 he took off again and headed east . . . his first cross country flight in the Parakeet and first flight out of the test area was a 4,000 mile trip to Oshkosh and return!

Undertaking such a flight on so new an aircraft was perhaps the builder's ultimate expression of confidence in both the design and his own ability . . . and at Oshkosh he found others with an equally high opinion of his efforts. The Parakeet was voted the homebuilt Reserve Grand Champion for 1980 . . . among 1547 of the nation's finest homebuilt airplanes, it finished second only to Fred Keller's ultra slick VariEze.

The Parakeet was an 11 year project — with one year out for moving his family from Minnesota to California and getting a new house and yard in shipshape — but Dick Borg and his interest in avia-

tion go much further back. He was born and raised two blocks from the Austin, Minnesota airport and was an airplane nut "from diapers up", he says. He haunted the airport as only a kid can and managed to get occasional rides in Cubs, Tri-Pacers and the like — some in exchange for menial tasks around the airport.

Dick credits a 5th grade teacher, an ex-fighter pilot, for providing encouragement at a critically impressionable point in his early years. Essentially, he was told if he ever expected to grow up to be a pilot, he would have to hit the books and "never bite his fingernails". The teacher was his hero at the time, so his advice was taken and followed . . . literally!

Model airplanes became an important part of Dick's life in his early teens, but gradually faded as his older modelling friends left for college or the service. From about the age of 15 until he was 21, Dick's interest shifted to hot rods — although he never lost his love for airplanes.

After getting married, Dick and his wife Mary moved to Minneapolis where both of them went to work for Control Data. With a lot of overtime for both of them, family finances soon were such

that Dick began thinking about flying once again. One day they were driving past Wold Chamberlain Field just as a Cessna 150 came drifting in overhead for a landing. Almost idly, Dick said, "I ought to learn to fly — I always wanted to."

"Yes, you ought to," was the welcome and somewhat surprising reply from his wife.

So he did . . . in 1963.

In 1965 Dick went to work for IBM and moved the family to Rochester, Minnesota. There he joined EAA Chapter 100 and soon became part of a little group determined to build replicas of the Rose Parakeet. Gordon Westphal, John Hanson and Dick decided to locate a set of the old plans, make workshop copies for each and work more or less in concert, sharing information and helping each other whenever the need arose.

Dick had been searching for a design to build for some time. He wanted a biplane, but couldn't decide which one from the many available to homebuilders. Then he saw the late Doug Rhinehart flying an air show at Blakesburg — and that was it. He had found his project.

Dick began work in September of 1969 — building the ribs and cutting out the spars. To cut costs, he had decided to

use Western Hemlock instead of the usual spruce and, consequently, spent a lot of time in lumber yards searching for aircraft quality boards. The wing fittings turned out to be a real challenge. Each was quite complex and most were weldments. It took longer to make the fittings than the wings, themselves, Dick recalls. Standard aircraft tie rods were called out for drag and anti-drag wires in the wings, but would have cost a tidy little fortune today. Instead, all 3 Parakeet builders decided to substitute 1x19 braided wire and turnbuckles.

In 1971 Dick accepted a transfer to San Jose, California and that was the year he lost on the project. When he did get back on it, the fuselage was started. "The Parakeet is a strange little airplane," Dick says. "In addition to all those complex little wing fittings, the fuselage was a real challenge. It has a lot of different tubing sizes and even changes in wall thickness from front to back. The airplane doesn't have a level bay in it — if you go by the plans. I deliberately leveled the second bay so I could use it as datum. This raised the fuselage — and the wing — by 3/8" over the standard set-up."

"Everything in this airplane is different," Dick explains. "You just can't buy parts for it like you can for a Pitts, Starduster, Skybolt, etc. You have to make everything."

The fuselage stringers are of aluminum instead of wood. In fact, the only wood on the fuselage is in the turtleback — which is 1/16" African mahogany over 4 bulkheads and 13 stringers. Dick preshaped the plywood skin by draping it over a saw horse and hosing it down as he watered his lawn!

A number of changes were made when the fuselage was started. The rudder and vertical fin profile was altered to a more rounded (and pleasing) shape; the turtleback was built to have a straight line along its topmost line — creating a little more baggage space; clamshell doors were built into sides of the cockpit to permit easier access; fuel capacity was increased to a total of 22 gallons, including non-standard wing tanks; die pressed springs were fitted to the landing gear in place of shock cords — pre-loaded to 300 to 350 pounds. The gear travel is only a couple of inches, but with the 5.00x5 tires, it seems to be enough; the engine is fully cowled and, finally, the lift strut fittings have been relocated so that Dick's Parakeet is the only one in which the lower wing panels can be removed without also having to remove the top wing.

The engine is a Continental C-85 . . . at least that's what the name plate says. Actually, it is a hybrid along the lines of those the late Bud Harwood used to build up for his lightweight, very fast Tailwinds. It has higher compression, has some C-90 and C-145 parts, among other things. Dick estimates he is getting at least 100 horsepower, perhaps more. He can turn it to 3150 rpm in level flight with a 72x55 wood propeller.

For cover, the Stits process was used — all the way. "I chose Stits because I had talked to all sorts of 'experts' and each had his own version of the 'only

way' to cover an airplane. "I went to Stits because with it you get a little book, the 'bible', which you can follow step-by-step and get a good job."

The color is Ag Cat Yellow trimmed in Dakota Black. The three inch N number on the rudder created a little controversy with the feds. The airplane is registered as N80RG . . . but as the number was originally affixed to the airplane, it read NBORG. FAA wouldn't buy it, however, so the B had to be changed to an 8.

Top end speed is somewhat irrelevant when you are enumerating the virtues of an open cockpit biplane, because if high cruise and top speed are what one is after, a biplane of the Parakeet type wouldn't have been chosen in the first place. N80RG does rather well, nevertheless. On the trip to Marana, Arizona, where we interviewed him for this article, Dick averaged 120 mph at 7500 feet. It climbs at around 1000 fpm, initially, in all but the most extreme density altitude situations. Where the Parakeet really shines is in handling and maneuverability. It is, Dick says, very quick, very responsive. He modified his ailerons to achieve a good gap seal and the results are quite dramatic compared to a stock Parakeet.

The airplane is not inherently stable — it is a smooth, light-to-the-touch delight to fly, Dick maintains, but has to be flown every second. "When I look down to study a map, then look up again, the horizon has gone off somewhere!"

"It feels like it loops in its own length," Dick reveals with what is obviously a pleased smile.

"Rolls are very, very nice and recovery is precise. You don't have to lead it by several degrees before where you want to stop. It stops NOW! It spins like a

Taylorcraft."

The long flight back to Oshkosh '80 was more than the Parakeet's initial cross country and even the winning of the Reserve Grand Champion award. It was also a reunion with his friends Gordon Westphal and John Hanson. All three of the Parakeets were at Oshkosh that year. Gordon's is fully cowed and is powered with a Lycoming O-290G (125 hp) and John's is uncowed and powered with a Continental A-65. John's version is the closest of the three to being a true replica.

Dick's was one of several airplanes that flew down to Marana from the San Jose, California, area, among them Maynard and Patty Ingalls in their big, highly modified Starduster Too. Dick says that Maynard was a big help to him whenever he needed assistance of any sort during the construction of his little biplane.

His Rose Parakeet replica allows Dick to perch comfortably astride the fence that makes good neighbors of homebuilt and antique airplane fans. In addition to his EAA activity, Dick is equally active in AAA. This past year he served as president of the Northern California Regional Chapter of AAA, co-sponsor with the Chamber of Commerce of the famed Watsonville Fly-In (see the Summer 1981 issue of **Sportsman Pilot**).

A Golden Age design by Jack Rose, the Parakeet is built today as an antique homebuilt replica. With larger engines replacing the Continental A-40 that powered the originals, the airplane is a very capable little sport aerobatic machine. It's sort of the best of three worlds — antiques, homebuilts and aerobatics. And when it's also a top trophy winner like Dick's, you've got a combination that's awfully, awfully hard to beat.

Richard Borg



Alex Strojnik's Self-Launching



S-2

Freedom is something you can never fully appreciate unless at some time in your life you've had it taken away . . . and no person suffers more when freedom is withheld than a creative genius.

With those profound thoughts in mind, I walked into a situation at the Marana, Arizona fly-in last October that was a classic of long shot probability. To a casual observer it must have seemed innocent enough: Bob Burbick of Sun City, Arizona was introducing me to Alex Strojnik, an Arizona State physics professor and the designer of a sleek new powered sailplane.

Ah, but there was a LOT more to it than a simple introduction!

Alex Strojnik is a Yugoslavian national who earned a degree in electrical engineering and a Ph.D. in aerodynamics . . . before the Communists came to power in his homeland. Under that political system the state decides one's career, and Alex was never allowed to work in his chosen field of aerodynamics. Instead, he was channeled into physics — which wasn't all bad because it ultimately brought him to the U.S. and to his position at Arizona State. Still, aviation was in his blood and he longed for the opportunity to be involved in it again.

Then one day Alex discovered EAA

and, through it, the freedom U.S. homebuilders have to create, to build and fly their creations. It was like opening up a new life for him . . . one he thought had been lost in an earlier time, in another, distant place.

And here I was being introduced to him by the single person in all the world most directly responsible for that freedom, that chance to create, to build, to fly.

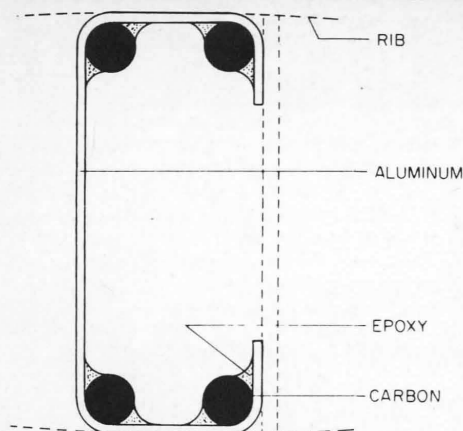
Bob Burbick, you see, was, in the late 1940s, the CAA official in Washington upon whose desk was tossed the request of a small bunch of Oregon "outlaws" who wanted to be able to legally build and fly their own airplanes. It was one of those moments that years later we look back upon and recognize as a crucial turning point in history. Of all the desks that request could have fallen upon, it happened to be that of a man not only already interested in homebuilding but also willing to fight the internal bureaucratic battles to get it approved.

Bob did fight . . . and homebuilding was legalized . . . and Alex Strojnik got to build his S-2. Then, finally, by some small quirk of fate, Bob and Alex have come from their disparate ends of the earth to live in the Valley of the Sun

. . . in greater Phoenix.

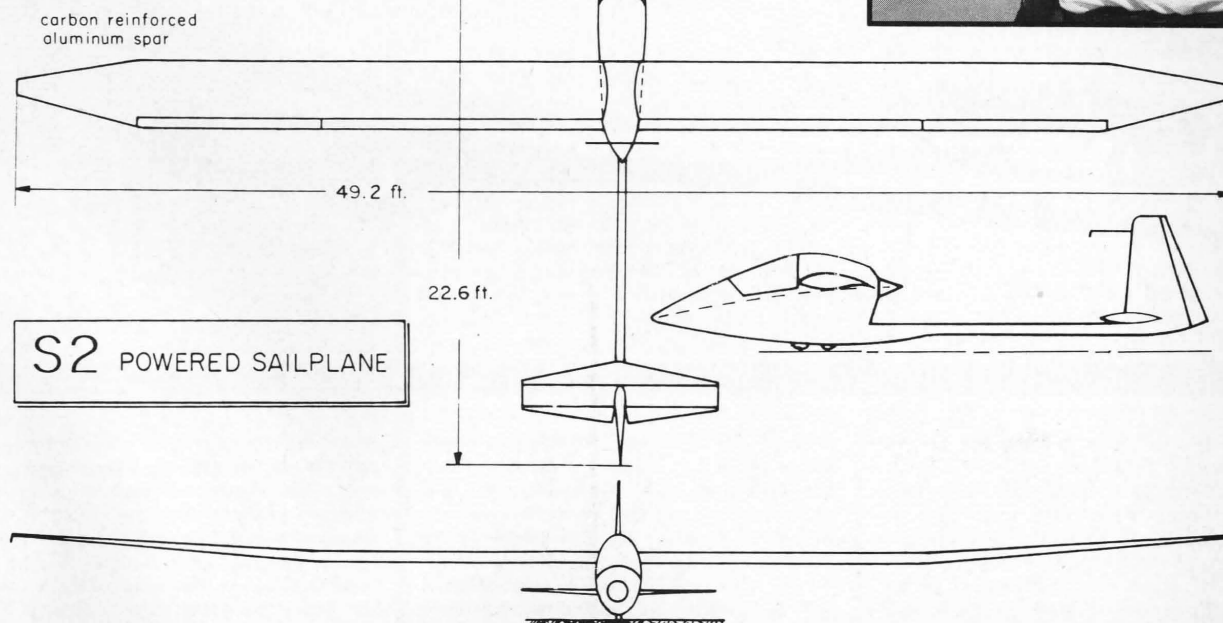
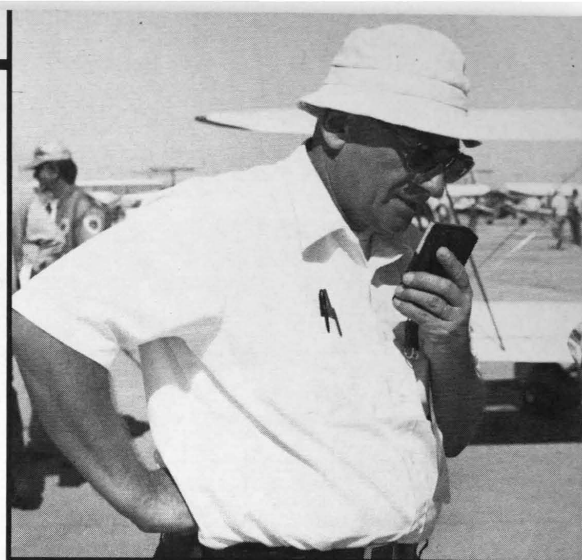
Alex Strojnik's S-2 is a 15 meter class powered sailplane that incorporates some very unique materials and fabricating methods in its design and construction. The wing spar is the most radical feature . . . and can best be understood by looking at the drawing accompanying this article. Off-the-shelf carbon fiber rods are bonded inside the four corners of a "C" section aluminum beam to create a lightweight, enormously strong spar. The aluminum beam serves as the spar web and the carbon rods function as the load carrying flanges. Fiber glass skins for the Wortmann air foil were laid up on sheets of Plexiglass . . . in 4 foot panels . . . and peeled off when almost cured. Draped smooth side up over a male mold, they sagged into the proper shape and finished curing. When ready, they were carefully bonded onto the wing structure, resulting in a skin with waviness of less than .003 of an inch. The contour of the wing's air foil is accurate to a tenth of a millimeter . . . without which its laminar flow characteristics are significantly diminished.

The inflight dynamics of the wing is something Alex is proud of. He says that in thermalling (or slow flight), the



Alex Strojnik taping the information in this article.

(Photo by Golda Cox)



wing (each panel) presents 3 distinct "steps" or faces to the air stream. The tapered outer portions (outboard of the ailerons) have a 6° wash-out (leading edge is canted downward 6°), the ailerons are drooped about 8° and the flaps are down 50°. This, Alex says, produces an aerodynamic distribution of lift that approaches that of an ellipse — the optimum for slow flight. The resulting glide ratio is around 34 to 1 . . . with a sink rate just over 2 feet per second.

The S-2's fuselage consists of a 4"x4" square aluminum tube that extends from nose to tail. Starting at the front, the battery, instrument panel, pilot's seat, the structure for mounting the wing and engine, the main gear and the tail surfaces are all carried by this big square tube. A fiber glass pod and canopy surround the pilot, wing/fuselage juncture and engine.

A 28 horsepower, pusher mounted, 2-cycle, electric start Swiss snowmobile engine powers the S-2. At Marana it was fitted with a fixed pitch wooden propeller, however, Alex was showing a nearly completed folding propeller he expects to use in the future. Built to the most exacting of standards, it has massive hinge points to handle the tremendous loads imposed by full power rpm (4500).

With the engine mounted where it is, a prop failure would risk cutting the fuselage tube — and tail — off, Alex points out, so his prop is well built.

Alex has come up with a rather unique landing gear. He hates "ugly, drag producing tailwheels" and he did not want the complexity and weight of a retractable main wheel, so an acceptable alternative was sought.

His solution consists of two small nylon wheels mounted in tandem beneath the fuselage tube. They are positioned in such a way that when at rest, the S-2 sits on the rear wheel, the tail skid and one of the two tiny nylon wheels built into the wing tips. When the pilot steps in, the tail comes off the ground about a foot and remains there during taxiing, take-off and landing. Steering on the ground is accomplished by blasting the rudder around with throttle. Applying brake, Alex can literally pivot on the braked wheel.

Alex bases his S-2 at Chandler's Memorial Airport south of Phoenix and flies as often as his busy university schedule permits. He uses the machine as it was intended to be — as a sailplane with an auxiliary engine for take-off, bridging the gap between widely spaced thermals and returning to the

airport. Soaring is the *raison d'être* of the S-2 and its design was an attempt to minimize the weight and drag penalties of a self-launching engine to greatest extent possible while retaining the best soaring capability.

Alex still has his prop to develop, but eventually he intends to market plans for the S-2. He says the folding prop is so critical that he would prefer to make and sell them himself. He might also make the wing skins, since he has the experience in their somewhat involved method of fabrication.

When Alex was a young engineer in Yugoslavia, he built an all wood tailless glider, the S-1. He crashed it — and banged himself up pretty thoroughly in the process. He had every intention of designing and building a new glider that would be successful . . . but the Communists came to power before he could realize that ambition. It took a while, but all of us who attended the 1981 Marana Fly-In can attest to the fact that it has finally happened. Alex flew the S-2 to Marana rather than towing it in a glider trailer — at least in part to show the practicality of his design. If soaring is your sport, you would do well to give the S-2 a close look.



Tom 'N Huck



If you've ever been to Oshkosh, you've seen 'em — Tom and Huck. They're always there and they fly constantly. Indeed, almost every time you look out on the flightline you'll see a silver L-5 being waved out onto the active for take-off . . . or you'll see it sneaking in for a landing over in the grass median area. You may notice it just often enough to wonder why it makes so many half hour sorties . . . invariably to the southeast of Wittman Field.

If you're ever down by the entrance to the Antique/Classic taxiway, you may be there when the L-5 comes rumbling in, its big six-cylinder Lycoming growling with authority. After shutting down, you'll see a couple of fellows bound out of the spartan cabin and begin a rapid fire, non-stop conversation that could only come from a couple of native New Yorkers. One of them, the shorter of the two, will be stooped from the weight of the cameras around his neck. He may look familiar, but if not, you'll recognize the name — he's Howard Levy, one of the country's best known aviation photographers. His excellent work appears in several U.S. and European magazines each month and he's been covering EAA Conventions about as long as anyone in the business.

The other one, the big happy guy, is Tommy Atkinson of North Las Vegas . . . and Huck? Well, that's **Mr. Huck**, the Stinson L-5.

Tommy and Mr. Huck have been flying Howard Levy on photo missions for the better part of the last decade and through the medium of several popular newsstand magazines, millions of people have enjoyed air-to-air pictures shot

through the birdcage of tubes and struts that make up ol' Huck's structure. Tommy estimates they've flown over 500 photo sorties in the past 10 years or so and he has no idea how many of the pictures have appeared in print.

Over the years Tommy and Howard have worked out a routine that makes the L-5 quite a versatile camera platform. Straight and level, it can fly with other airplanes as slow as 55 mph and as fast as 130. To enhance this capability, on both ends, they fly their photo runs in big lazy circles. Slow airplanes fly on the **inside** of the L-5 and fast ones fly on the **outside**. This also keeps the subject aircraft in a shallow bank which makes for a more interesting photo angle.

MR. HUCK

Mr. Huck is a 1943 Stinson L-5 that saw service in World War II in Europe — 690 hours in all. It was brought home after the war and eventually cashiered in favor of the new kid on the block — the Cessna Bird Dog. The Stinson was bought (or given?) to Spartan School of Aviation in Tulsa, which, in turn, eventually sold it to a fellow in Madison, Wisconsin. Tommy and a partner bought it in 1970 and sometime later, Tommy became the sole owner. He says about 1500 hours have ticked by on the tach since he's owned the ol' bird, divided largely between CAP search and rescue missions in the Vegas area, trips to area fly-ins and, of course, his annual trek back east to Oshkosh. Tommy and Mr. Huck are regulars on the Kansas City segment of the AC Flight Rally — and they finished third last summer. This

is one of the highlights of Tommy's year and he can't understand why more pilots don't participate. He has a great time meeting old and new friends each summer, occasionally picks up a little cash when he places high enough . . . and loves the food! The contestants are fed so well at contest stops, including the annual banquet at its conclusion, that Tommy refers to the Rally as the Gourmet Run!

Since he has owned the airplane, Tommy has completely rebuilt it — recovered the airframe and did a thorough chrome major on the Lycoming O-435 (190 hp) — the latter in his dining room! The engine was balanced to satisfy the usual desire for a smooth running engine, as well as to gain a little psychological edge on those days when a search and rescue mission puts the L-5 over some awesome terrain out there in our desert Southwest.

Mr. Huck is based at the North Las Vegas, Nevada airport. It's all silver and is in the markings of the Nevada CAP. Registered with the FAA as N62454, ol' Huck is one of 4,202 L-5s built in the early 1940s.

TOMMY

Earlier, I intimated that Tommy is a native New Yorker — he is, from Flushing, Long Island. He's been gone for a long time, however. When he was just a young sprout, he joined a local unit of the New York Air National Guard — just in time to get federalized in 1951 as the Korean Police Action got into full swing. Transferred to March Field at Riverside, CA, Tommy was like B'er Rabbit being thrown into the briar patch!

March, you see, is less than ten miles from FlaBob Airport in Rubidoux, and it soon became his home-away-from-home. One of the first persons he met there was Ray Stits — who, in turn, introduced him to Lester Cole of Cole Brothers Airshow fame. Lester was doing some instructing and was willing to take on Tommy as a new student. He flew as often as expenses and his Air Force flying would permit — which kept lessons few and far between. He was in a weather recon unit — in B-29s, B-36s and, later, B-50s, and missions were long and frequent. As it turned out, Tommy completed his flight training in Illinois, while back there attending an Air Force school.

I asked for some particulars on his B-36 service and was surprised to learn Tommy has over 1000 hours of flight duty in the huge 6 engined pusher. He was an "airborne weather equipment technician/gunner" he recalls with a chuckle. "Actually, I was a glorified gear and flap indicator." From his duty station he was responsible for calling out gear and flap positions during take-off and landings. He recalls the B-36 as a good airplane. "We flew them from 1953 to 1957 and we never had a bit of trouble with ours," he recalls — which is a little different from what we hear these days from "historians" (who weren't there, of course!).

Tommy was later assigned to WB-50s and flew on 60 weather recon missions over the North Pole.

All the while, he was getting involved in EAA and making it an integral part of his life. He was in the group at FlaBob that chartered EAA's first Chapter; was a member and served a term as president of Chapter 52 in Sacramento; was a member of Chapter 26 in Seattle, etc. — wherever he was stationed, he joined the local Chapter. If there wasn't one in the area, he helped start one.

In the early 1960s, Tommy went to A&P school and later became a crew chief on F-106s at Tyndall AFB near Panama City, FL . . . and crewed F-100s in Viet Nam in 1966 and '67. He ended up his Air Force career at Nellis AFB at Las Vegas, crewing F-104s, and liked the area so much he decided to settle there when he retired in 1971.

The L-5 is the first and only airplane Tommy has owned, and the second he has restored. He had previously rebuilt Ray Stits' "World Smallest Airplane", the low winged Stits Jr. (which Ray still owns). Tommy did the work just to get experience on tube and fabric type construction.

Tommy loves Vegas — but not for the usual reasons. He can take the slots and shows or leave 'em — it's the year 'round flying weather, the wide open spaces and the proximity to Arizona and California EAA activity that make it an ideal, centralized place for a sport aviation flyer to live. He and a friend had flown down to Marana for the Arizona fly-in when we cornered him to tape a little conversation for this article. Attend almost any fly-in in the Southwest and you're likely to run into him yourself.

Tom and ol' Huck are about as inseparable as an earlier, fictional pair with the same names.

Sportsman Pilot Visits...



ROTORWAY, INC.

Head south out of Phoenix on I-10 for a few miles and you'll soon spot a cluster of buildings off to the left with the name "RotorWay" painted prominently on one of them. Take the next exit and keep turning left and you'll soon arrive at the home of the Scorpion helicopter. Golda and I did it and were met by the founder, president and chief designer, B. J. Schramm. We had been invited to stop by for an after hours tour of the multi-structure complex to see how the Scorpion Too and new Exec kits are made . . . and to a certain extent, I suppose, to see just what makes B. J. tick.

The latter was important to me because there is no one in our esoteric little world of sport aviation who has grabbed a bigger tiger by the tail than B. J. Schramm. Here's a guy who has taken it upon himself to try to be the Henry Ford of aviation — the man who would finally, after so many others had failed, put the average person in a true door-to-door aerial transportation device. He would create a small helicopter that a reasonably successful wage earner could afford to purchase, learn to fly, operate and maintain. No one in aviation (and a lot of other fields of endeavor) has set himself a more formidable task.

In the broadest of brush strokes, this is what B. J. has battled to accomplish:

- To create a helicopter affordable by the number of people he wanted to put in the air meant it would have to be a homebuilt. FAA certification costs absolutely dictated it.

- Then, to create a kit simple enough for John Q. Public to put together properly would require his making the really critical parts of the control and drive systems himself and including them as bolt-on parts in the kit. This, in turn, would mean long sessions with FAA over the so-called "51% Rule" to insure the kit could legally be built by amateurs.

- And to create such a kit at a price the desired number of people could afford, he would have to somehow achieve a level of manufacturing efficiency and productivity never before attained by a helicopter manufacturer. As the years have gone by, this has ultimately meant bringing almost every operation, every process in house . . . even the design, development and manufacture of his own engine!

- And, finally, to make it possible for his customers to safely (and affordably) learn to build, fly and maintain their helicopters, a comprehensive training program would have to be conceived and implemented. In the end, B. J. found it necessary to design a special purpose building to house his "Helicopter U".

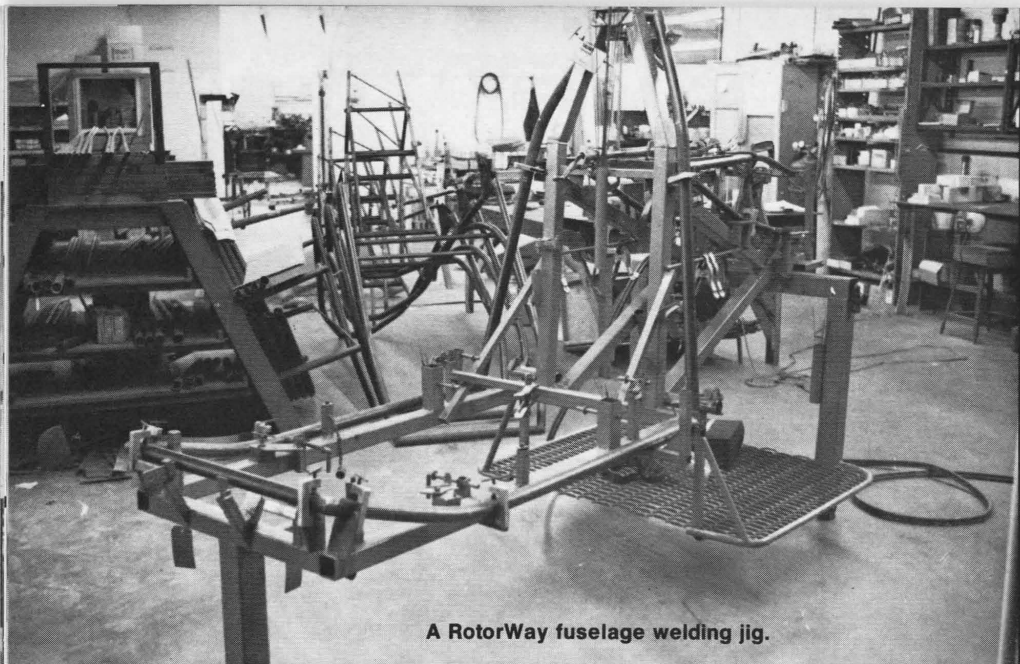
It's never easy being the pioneer in any field, and over the past decade and a half B. J. has had more than his share of opportunities to reflect upon the verity of that old cliché. He's hung in there, though, and has come closer to putting a helicopter in every garage than anyone else ever has . . . and closer still than the cynics ever dreamed he could.

. . . And we had come to inspect the field of battle.

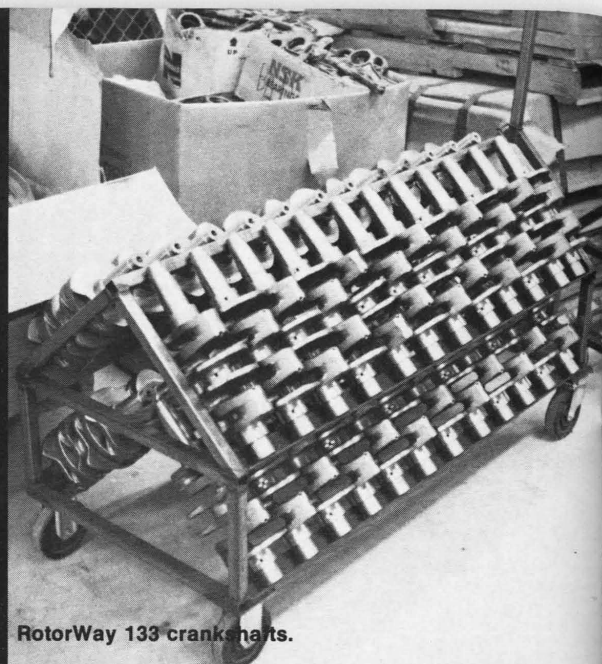
We started our tour more or less through the back door of RotorWay — through the shipping department where big crates for Scorpions and Execs are packed and sent on their way to customers. One area we found walled off and under lock and key. B. J. opened it up and led us in without explanation. He didn't have to explain . . . one look at the contents of the bins that lined the walls told all: this was the aircraft hardware and small parts storeroom. Given current prices of AN hardware, gears, bearings, rod ends, etc., he probably should keep a couple of vicious Dobermans roaming inside.

From there we progressed through one department after another — where the tubular fuselages are welded up, where the rotor blades are fabricated, the fiberglass department, the room containing the molds and ovens for forming the huge windshields, etc. All the while, B. J. was opening wall cabinets stacked with jigs and fixtures — the "hard" tooling necessary to make parts in large quantities. He took particular pains to explain the procedures and record keeping employed in the inspection of all drive line and control system parts. Everything is inspected, but these parts get special treatment.

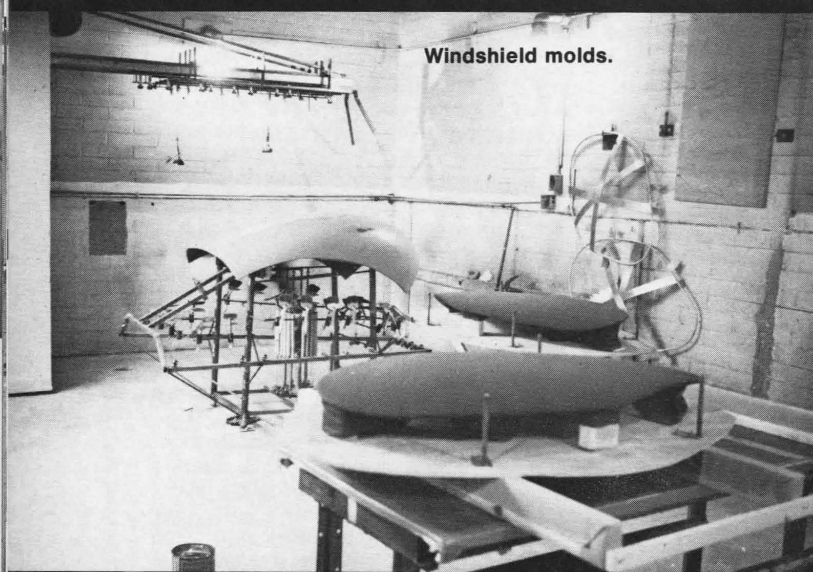
I've toured a number of the lightplane plants (as well as the shops of homebuilt kit producers) and the most noticeable difference at RotorWay is the number of machining operations. It seemed that every nook and cranny in the plant contained machinery for doing something to big chunks of metal — cutting, drilling, facing or whatever. And don't



A RotorWay fuselage welding jig.



RotorWay 133 crankshafts.



Windshield molds.



Molds for fiber glass fuselage shells.

overlook the emphasis on "big" concerning those hunks of metal. A helicopter rotor hub and associated control system are made up of individual parts, many of which are machined out of some really massive pieces of raw metal — **expensive** metal. The bottom line on this is that RotorWay has one heck of an investment in metal working machinery.

But this was just half the story we were looking for at RotorWay. More than anything else, I wanted to see the engine plant. Nothing sets RotorWay apart more than the fact that it makes its own engine, from casting the case in its own foundry to test running each in a fully instrumented test cell. (Weedhopper is the only other flying machine manufacturer in the U.S. that makes its own engines.)

The engine, of course, is the key to everything B. J. Schramm has attempted in pursuit of his dream. It's the most expensive single item in any kind of aircraft and he knew from the beginning that he would have to find some way to cut the cost of an engine — dra-

matically — to have any hope of producing a low priced helicopter. B. J. began by taking advantage of the high power to weight ratio of two-cycle outboard marine engines, and a lot of single and two place Scorpions flew well with them. There always was a nagging problem, however. It takes a little more engine savvy to successfully operate a two cycle engine and some owners just couldn't seem to get the knack of it. Ultimately, B. J. bit the bullet and went into the engine manufacturing business, himself, producing a four cylinder, four cycle, horizontally opposed, liquid cooled powerplant — in both helicopter and fixed wing versions because a larger market than afforded by helicopters only was needed to make the engine economically viable. It has been a bitter disappointment for B. J. that the fixed wing market has not developed . . . and as we walked through the engine assembly room, he pointed out a tall stack of case halves that represent the end of the line for that valiant effort. They'd been set aside to be broken up and melted down — but he just hadn't had

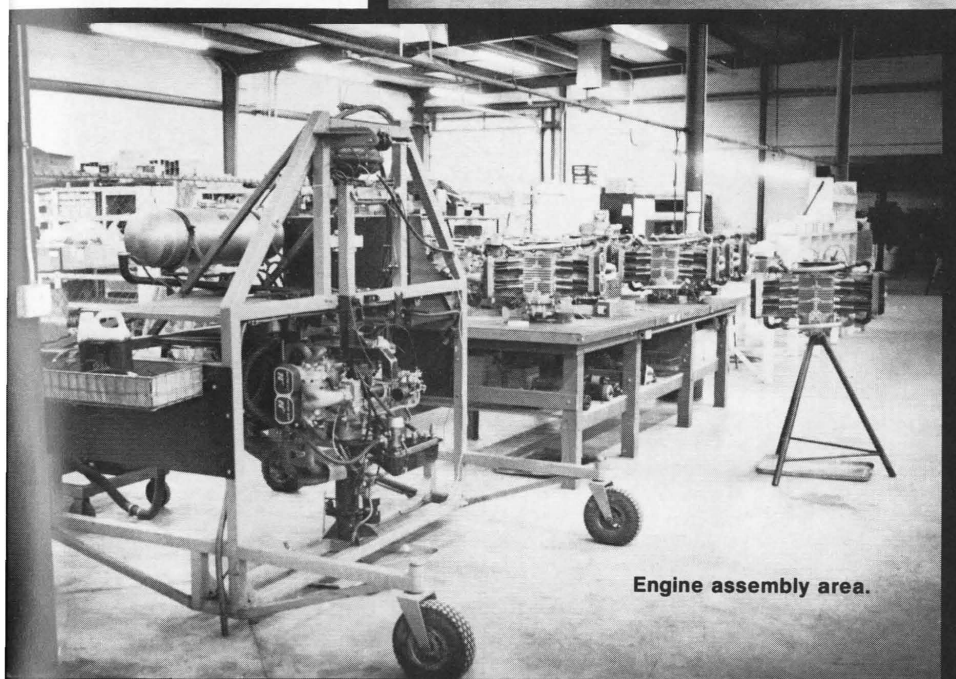
the heart to do it yet. This, of course, casts a pall over the helicopter engine, but a number of avenues were being investigated to keep the production line going.

The foundry was a bit of a surprise. It was much larger than I expected and more sophisticated than one would anticipate being needed to support the relatively small engine production. I quickly learned that it is a semi-autonomous operation that takes in a lot of outside work to make money to keep the helicopter engine line moving. A lot of big irrigation pipe elbows and valve casings are cast and special jobs like bronze commemorative plaques are taken in from the local area.

Next, we drove over to the adjacent flight training and sales facility, a handsome new building designed around the modern concept of programmed learning. We walked through classrooms, each equipped with an array of video tape equipment for teaching ground school, kit construction or maintenance. RotorWay has spent a bundle producing these video tape courses, but they are



RotorWay Flight Center "hangar".



Engine assembly area.



RotorWay foundry.

invaluable in that they permit the student to progress at his own pace — he can re-run the tapes until he has mastered the material. Other areas include the storage and maintenance hangar for the school helicopters, a sales lobby/showroom, sales offices and a large glass walled lounge overlooking the landing pads outside.

Significantly, this building (and its training program) was to have been the first of a number to have been built around the U.S. At the time of our visit, however, the new ones were on hold due to the depressed economy.

You begin to realize the true scope of the RotorWay program when you learn the price you pay for one of their helicopters includes this training program. You buy the helicopter, learn how to build and fly it and how to properly maintain it — all in one package. This is the extent to which B. J. Schramm has carried his dream to put us all in helicopters, should we so choose. You have to wonder, though, if there aren't times when B. J. looks with envy at homebuilt airplane kit manufacturers who only have

to design and produce an **airframe** . . . some of which are priced higher than the RotorWay package price!

Our arrival at RotorWay's door was at sunset on a Sunday evening and it was well into the night before we were ready to depart — thus we weren't able to play with the toys. It would have been interesting to have had a demonstration of the Exec's new rotor blades with their high lift, asymmetrical air foils . . . but that will simply have to wait for another time. B. J. says he can now do the same things he could with the old symmetrical air foil blades without working the engine nearly as hard — and autorotation is a much safer operation. You've got to go to some very expensive, big time helicopters to see another rotor blade air foil like RotorWay's new one. It's been a tough job getting it to work on blades as small as the Exec's, but persistence finally paid off.

The world of helicopters — particularly homebuilt helicopters — is . . . well, **different**. Whereas most new EAA members are already in aviation — pilots, mechanics, etc. — most of B. J.'s cus-

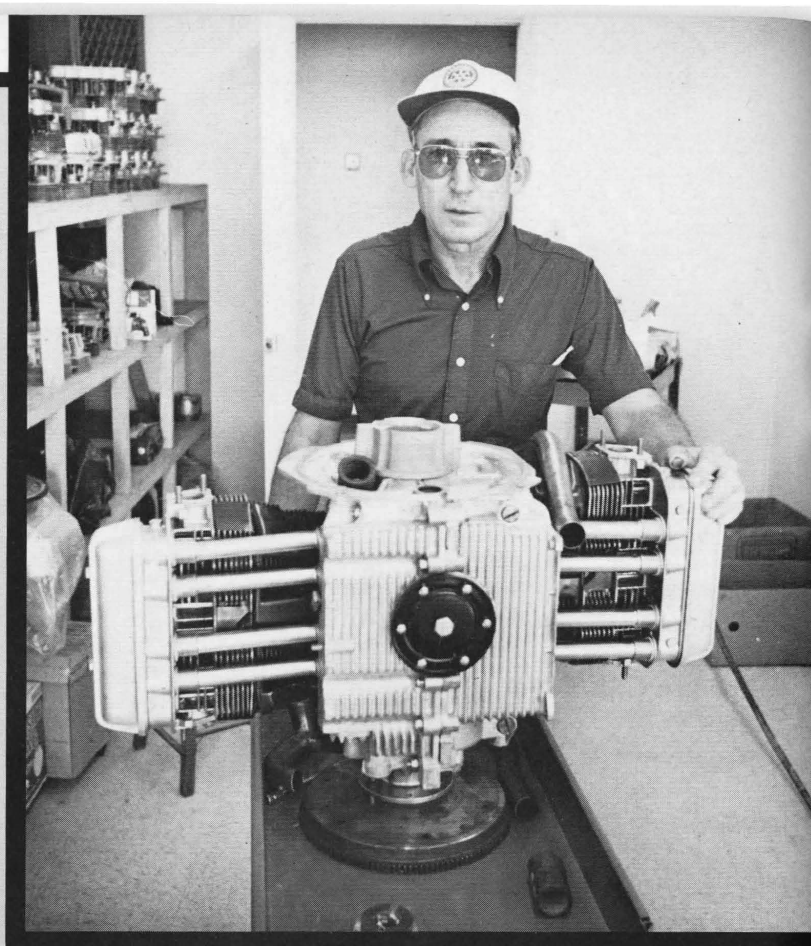
tomers for Scorpions and Execs are initially from outside aviation. A large percentage have never flown anything, but look on the helicopter as their dream machine. Typically, their initial flight training is in their own machine — that they built themselves. B. J. has always been a staunch supporter of EAA, PRA, etc., even though he finds few new customers among their memberships. His customers often end up joining the sport aviation organizations after they start building their helicopters instead of the other way around — EAA or PRA members who decide to build a Scorpion or Exec. In this way RotorWay has made a significant contribution to the sport aviation world, over and above the machines, themselves.

I can't do more now than shamelessly taunt all of you with a hint of mystery, but keep your eyes on RotorWay for the next year or so. There are technical developments afoot that . . . (censored)!



HAPI AT ELOY

Rex Taylor, founder and president of HAPI, with one of his engines.



With avgas having acquired the status of "liquid gold", VW powered homebuilts have taken on new importance . . . which, in turn, has aimed the spotlight squarely on the outfits modifying the little four-banger for aircraft use.

Homebuilt Aircraft Products International — or HAPI as everyone knows it — is a VW based aircraft engine producer of considerable note. Until October of last fall, the firm had operated out of a facility at the Calexico, California airport — in the prime dune buggy territory of the Imperial Valley and just north of the Mexican border. The latter was significant, in that Mexico is now the source of VW cases, cranks and other parts. HAPI's sales have been growing in leaps and bounds in the last couple of years and its Calexico facility was quickly outgrown.

For a variety of reasons, including smog, population density, high taxes, etc., Californians have been moving east into Arizona in droves in recent years, and now HAPI founder and president, Rex Taylor, has joined the exodus. He was able to strike a bargain with the town of Eloy, Arizona which not only provides him with a fine air conditioned building for his engine business, but, in effect, makes him the Eloy airport FBO. The building is the former FBO's shop and offices and it includes the aircraft parking ramp and avgas sales. Further, Rex and his wife, Phyllis, have set up a large mobile home right beside the new HAPI works so that their daily "trip" to the office is a walk of about 15 feet!

The town of Eloy is located beside I-10, the superhighway that connects Phoe-

nix and Tucson, and just south of the intersection of I-10 and I-8, the fast lane to San Diego. If you look it up in your atlas, you'll see Rex has relocated to the transportation arterial heart of one of the fastest growing areas in the United States. In mid-October, Golda and I stopped by for a day on our way south to the Copperstate Fly-In at Marana and even though HAPI personnel were still unpacking boxes, stocking shelves, etc., it became obvious as the day wore on that Rex had picked a strategic location. EAAers were arriving by auto and plane all day long.

The Eloy airport, incidentally, is a fine facility with lots of space for industrial expansion in and around it. The city fathers, Rex told me, are going all out to attract industry to the town and would like to talk to any of you who want to relocate or expand your business to their state.

Although still far from unpacked as I've said, HAPI already had its engine build-up operation going. This gave me an opportunity to examine a number of them in various stages of assembly and to learn what kind of after market parts go into them. There were, I found, two areas of particular interest: the "international" scope of the parts sources and HAPI's unique approach to dual ignition.

First, the goodies that go in a HAPI engine come from all over this world. The crankcase is a Universal Transporter block from VW's plant in Mexico . . . "universal" because it will retrofit back into almost all the earlier 1500 and 1600cc VW engines, both "suitcase" and vertical blower jobs. It has provision for both

standard and remote oil dip stick installation and has bosses for all the accessories the various models have had over the years.

The crankshaft is something of a surprise. It is from the 1500cc engines of the late 1950s — which the auto racing crowd has long recognized to be the best VW has ever made for really hard use. It is a high quality forging (don't talk to Rex about anything but forged cranks in VW aircraft conversions!) with large oil feed holes to all the bearings. Rex has a source for these cranks in Mexico and they are, of course, thoroughly tested for straightness and molecular integrity. They are reground .010 and tapered to take a prop hub.

Following the example of the Mexican case and German crankshaft, the other parts come in from everywhere:

- Camshafts are Brazilian — reground in the U.S. to HAPI's specs.

- Connecting rods are Japanese.

- Pistons and cylinder assemblies are Japanese.

- Piston rings are a new "gapless" type from Performance International Corporation in LA — a real power booster, Rex says.

- The starter is from Spain.

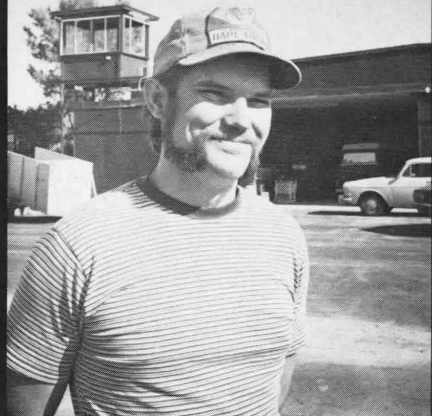
- Starter ring is from Australia.

- Heads come from either Brazil, Germany, Mexico, Japan or Korea!

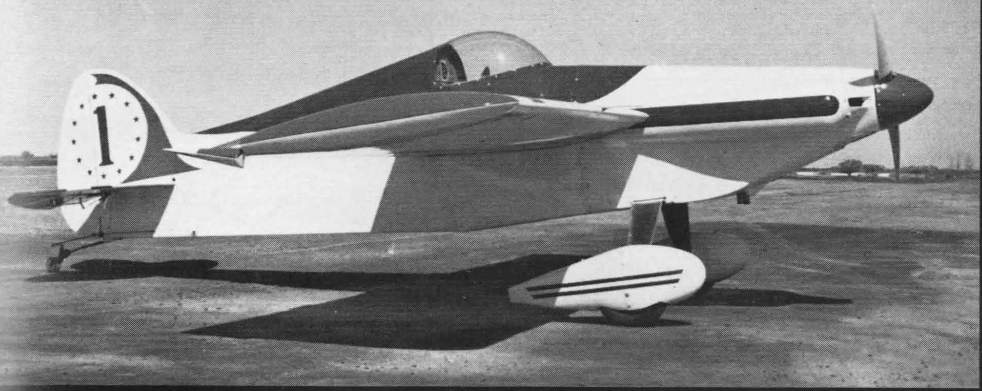
- Bearings, valves, mags, carb and special items made by HAPI are, of course, from the U.S.

The "dual" ignition used on HAPI engines is really more like a "primary" and a "secondary" system. A Slick mag is used for the top or stock set of 14mm plugs, but a smaller hole has been drilled

Patrick Taylor, Rex's son. He manages the engine build-up at HAPI.



Pilots fly in to visit HAPI every day. This beautiful little Sonerai belongs to Rollin Caler of Boulder City, Nevada . . . and is, of course, HAPI powered.



on the opposite (bottom) side of the combustion chamber for a 10mm plug. The latter is fired by an electronic ignition system utilizing what are called Hall Effect sensors. Instead of points, they have a couple of rotating permanent magnets — they pass the sensor units and trigger the electronic modules which, in turn, tell the coils to fire. There are no points, no rotor, no distributor cap, no moving parts subject to wear.

The thinking behind the small plug is that its spark will fire the mixture just as well as a 14mm plug, so there is no need to further weaken the cylinder head by drilling a large hole in it. An unexpected benefit of the "secondary" ignition has been its effect on carburetion. A persistent mixture problem had been plaguing HAPI — when it was rich enough to take a rapid advancement of the throttle without coughing and sputtering, it was too rich for idle. As soon as the "secondary" ignition was installed, the mixture problem vanished. Now the engine runs smoothly through the full cycle from idle to full power.

The engine runs well on either system alone, Rex says. He gets a drop of about 20 rpm with **either** shut down. About the only disadvantage Rex can see in the electronic ignition is that it must have a battery in the loop — and nothing works if it fails. For that reason, he still recommends the dual system or the mag only system . . . in preference to the electronic system only.

"I think it (the electronic ignition) is inherently less prone to problems than others . . . but when you consider it as part of a system consisting of a battery, alternator, etc., that **total** system is

simply more prone to failure than the old mag set-up."

If you followed the series of articles Rex wrote for EAA's Sport Aviation in 1980, you know he takes a conservative approach in many areas of VW modification. For example, he uses stock single port heads (instead of dual ports) because he has found them to cool a little better and besides, he says, there aren't any real performance advantages with dual ports until the engine is turning over 4400 rpm or so. HAPI engines are set up to run in the 3200 to 3600 rpm range, which is where VW intended them to be operated in Beetles. There, Rex believes, the engine is the most reliable.

The Taylor's son, Patrick, is a partner in HAPI and manages the engine build up. Rex is the research and development man and the firm's promoter. Just a few days after our visit, he was off on a voyage to New Zealand and Australia to sell HAPI engines . . . and tie up loose ends on the deal with John Corby to market the Starlet in the U.S.

HAPI is producing an average of about one engine per working day . . . 2/3 of which are currently going for Dragonflys. (The Dragonfly prototype has a HAPI engine.) These, along with the engines being turned out by HAPI and its competitors for Q2s, KR-2s, Polliwagens, Sonerai 2's, etc., constitute a significant and growing percentage of today's homebuilt market. Together they represent aviation's equivalent of the "downsizing" going on in Detroit.

It's a sign of the times.



Harold McDonald of Phoenix is a home-builder who came by his latest project naturally. In World War II he flew a combat tour in the Martin B-26 Marauder but upon his rotation back to the states, was transferred to a fighter squadron . . . flying P-47 Thunderbolts. He was put back in the heavies later — and went on to a career that included duty as a C-46 instructor, spent much of the 1950s in the Far East, back in the states and into the KC-97 and his final 6 years in the KC-135. Retiring in 1964, Harold became a corporate pilot and currently flies Lears and Cessna Citations. All of it has been fun but that short tour in Thunderbolts is something he never really got over. Thus, when some of his friends began talking about building a flight of 1/2 scale P-47s, all Harold wanted to know was, "When do we start?"

He started his lil' Jug in October of 1976 and flew it in October of 1980. Of 3 projects begun at about the same time, his was the second to be completed. (Gill Hallquist, who had his P-47 at Oshkosh a couple of years ago, was first. The third one, powered by a 150 Lycoming and fitted with flaps, should have flown by the time you are reading this.)

All three mini-fighters are based on the W.A.R. P-47 drawings. The primary all-wood structure is pretty much off the plans, but the foam and glass secondary "cosmetic" structure, the landing gear and a few other details were modified to suit the engineering intuition and aesthetic sensibilities of the Phoenix Three.

First, they were not satisfied with the lines of the W.A.R. Thunderbolt. New fuselage lines were lofted, restoring the proper deepness in the belly, the proper positioning of the stabilizer and the correct oval cross section. They built their own molds for their cowlings and fuel tank. The landing gear, including the retractable tail wheel was completely redesigned. It is hydraulically actuated, using a Gerdes master cylinder with a check valve in it and a hand pump. About 20 strokes are required to get the gear up and locked. It free falls to the down position, with perhaps 7 or 8 strokes to get the gear lights on.

Empty weight of Harold's P-47 is 880.5 pounds and gross is 1300. Powered by a Lycoming O-235 (115 horsepower) turning a 4 blade Warnke propeller, it cruises at 150 mph at 23 inches and 2300 rpm — burning 5 gallons per hour. Stall is at 70 mph. Harold approaches at 100 mph initially, bleeding off to about 90 over the numbers. From there it's just held off until it settles in. He finds the airplane easy to fly and land — very stable, but very sensitive.

The airplane is unrestricted — it has had its homebuilt operation limitations amended to include day and night IFR and aerobatics. The cockpit, naturally, is equipped with the necessary electronic goodies and flight instruments to accomplish the IFR mission.

Finished in Imron, the Thunderbolt is painted in the markings and color scheme of a World War II pilot who is a retired Major General today. Harold plans to contact him and get as much history on the original as possible. He does know

Harold McDonald's 1/2 Scale Thunderbolt



Harold McDonald's 1/2 scale Thunderbolt.

it was occasionally flown by a Polish Flight Officer who downed a Me. 109 on June 24, 1944.

At Marana, the little fighter had logged 109 hours, including a flight to Arlington, Texas to attend the 506th Fighter Group reunion and another to Arlington, Washington for the EAA Fly-In there. Harold had Gil Halquist as a wingman on both trips.

All three of the 1/2 scale Thunderbolts are hangared at Falcon Field in Mesa, Arizona (just east of Phoenix). Doug Champlin's Fighter Museum is also located there and just this fall put its newly restored razorback P-47 on display. Wouldn't it be one heck of a photograph — the real thing with 3 tiny Thunderbolts right off its wing! ☺

Approved IFR Thunderbolt panel.



Harold McDonald and his tiny Thunderbolt.

(Photo by Golda Cox)

PIMA

AIR MUSEUM



The entrance to the new hangar at the Pima Air Museum. Early Blue Angel and Thunderbird aircraft stand guard.

The government of India donated this B-24J to the Pima Museum and it was flown 11,000 miles to Arizona by a volunteer crew.



After saying our goodbyes to the troops at Marana, we headed south on I-10, through Tucson and southward still until we reached the Wilmot Road exit (#269). Turning north we drove toward the towering vertical fins of some BIG airplanes we had been able to see for the last 5 miles or so. Shortly, we drove into the parking lot of the Pima Air Museum, a largely outdoor display of military aircraft of the World War II and subsequent eras. The name comes from Pima County, in which the facility is located. The airplanes come from just down the road apiece — from one of, perhaps THE largest airplane graveyards in the world.

Davis-Monthan Air Force Base is located right in the southeast corner of Tucson, and to its south and east lies

a vast reservation on which the military has been parking its obsolete flying machines since the 1940s. The bone dry climate is ideal for those that are being preserved as a source of spare parts or (as in the case of Viet Nam) for reactivation. Many, however, ultimately end up in a scrapping operation located near the entrance to the Air Museum.

Back in the mid-1960s, Col. I. R. Perkin, then commander of the military aircraft storage and disposition center of Davis-Monthan AFB, got the notion that examples of fast disappearing types should be preserved. Members of the Tucson Chapter of the Air Force Association agreed and the Pima Air Museum was founded in 1966. 320 acres of surplus government land were purchased, of which 30 acres were fenced

for aircraft display. 35 airplanes were towed over from Davis-Monthan in 1969, but it was May 8, 1976 before the Museum had its official opening.

As of our visit last October, approximately 120 aircraft were on display and a new hangar to house fabric covered airplanes was nearing completion. The museum is open all year except Christmas. Hours are from 9:00 a.m. to 5:00 p.m. (the entrance gate closes at 4:00 p.m.) and admission when we were there was \$2.50 for adults. Depending on the timing of your visit, it might be important for you to know that a motel, restaurant and gas station are located at the Wilmot Road exit of I-10 — within sight of the Museum.

Now, with all the aviation museums scattered around the nation (and world),

This is the Hellcat that was found in 3400 feet of water off San Diego a few years ago. It was raised and found in good enough condition that the machine guns were oiled and fired . . . after 26 years at the bottom of the sea! The pilot survived the wheels up ditching in 1944 and has visited the airplane at the Pima Air Museum.



All you Hump pilots rejoice — the Pima Air Museum has preserved a fine example of your beloved Curtiss Commando.



Pima has quite a collection of helicopters, one of the rarest of which is this little McCulloch HUM-1. The first tandem rotor helicopter, it is a 2-seater powered by a 200 hp Franklin.



This 1940 Boeing Stratoliner was originally Pan American's "Flying Cloud". Later, it was the personal transport of "Papa Doc" Duvalier of Haiti. Now owned by the National Air and Space Museum, it is on loan to the Pima Air Museum.

why would one want to travel to an out of the way place like this to see another? Well, make no mistake about it, you are truly in the middle of nowhere when you drive into the Pima Air Museum's parking lot, but, nevertheless, I think it's worth it. There are two things that impressed me about the place: first, this is where you want to go to see the BIG airplanes of our not-so-distant past and, second, there are a number of rare types from the 50s and 60s that you are not likely to see elsewhere — not in one place, at least.

Some really big hogs are on display here — a C-124C Globemaster (173' 3" span) and a C-133B Cargomaster (179' 8" span) — not to mention a B-24J, B-29, KB-50J, B-47E, C-54D, KC-97G, VC-118A, C-119C, Martin PBM-5A Mariner (here

in the middle of the desert!), and the darndest collection of Constellations — a C-69, VC-121A, EC-121H, etc. Rare types include a Douglas B-18A Bolo, Douglas B-23 Dragon, Lockheed 10E Electra and a Boeing S-507 Stratoliner.

Then there is quite a collection of types that soldiered between World War II and Viet Nam that seem to have sort of sunk into the shadows of history — like the F-89J Scorpion, F-94C Starfire, F-100C Supersabre, RF-101H Voodoo, F-102A Delta Dagger, F-107A, Douglas A3D-1 Skywarrior, McDonald F-3B Demon, Douglas F4D-1 Skyray — and a number of others.

There are the superstars, of course — the Skyraider, F-86H Sabre, P-38 Lightning, C-47, B-17, B-52, B-25, etc. — but with some odd gaps: no P-51, for in-

stance. Ah well, nobody's perfect!

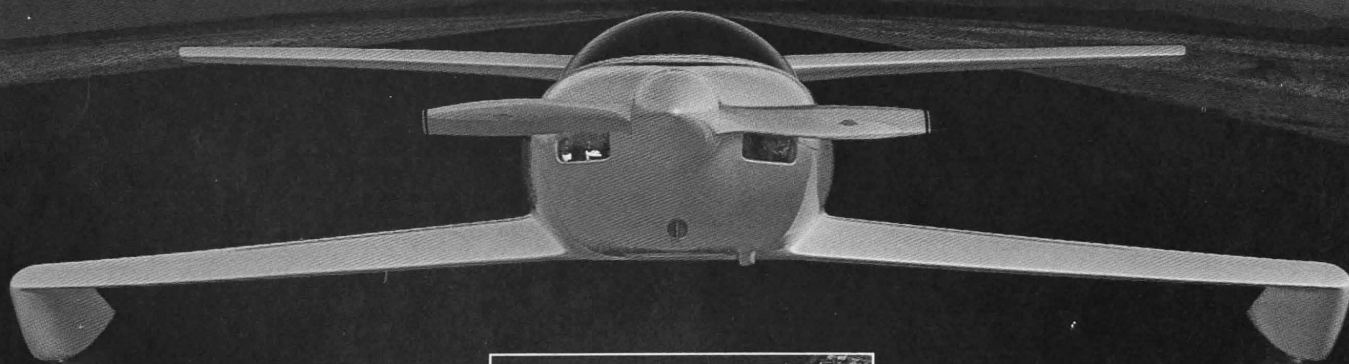
In addition to the airplanes, there are a number of early military helicopters and guided missiles and even a World War II barracks, a portion of which is going to look awfully familiar to you U.S. Army Air Force types! Finally, there is a gift shop with a variety of museum related goodies you might want to purchase.

Unfortunately, you sportsman pilots can't fly into the Pima Air Museum. Tucson International is the nearest airport and it is perhaps a half hour drive from there by rental car. Your best bet is to make it a side trip when you attend the Copperstate Fly-In next fall. However you get there, the museum is well worth the effort. ☺

When the Constellation first flew in 1943, it was the fastest air liner in the world — capable of about 340 mph. The first 22 built were impressed into the Air Corps as C-69s . . . and after the war were turned over to TWA. This is the 10th one built and is the only one left. It was lovingly restored by a TWA crew — and includes TWA mounting stairs and a tug.



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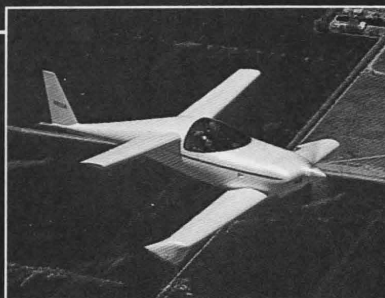
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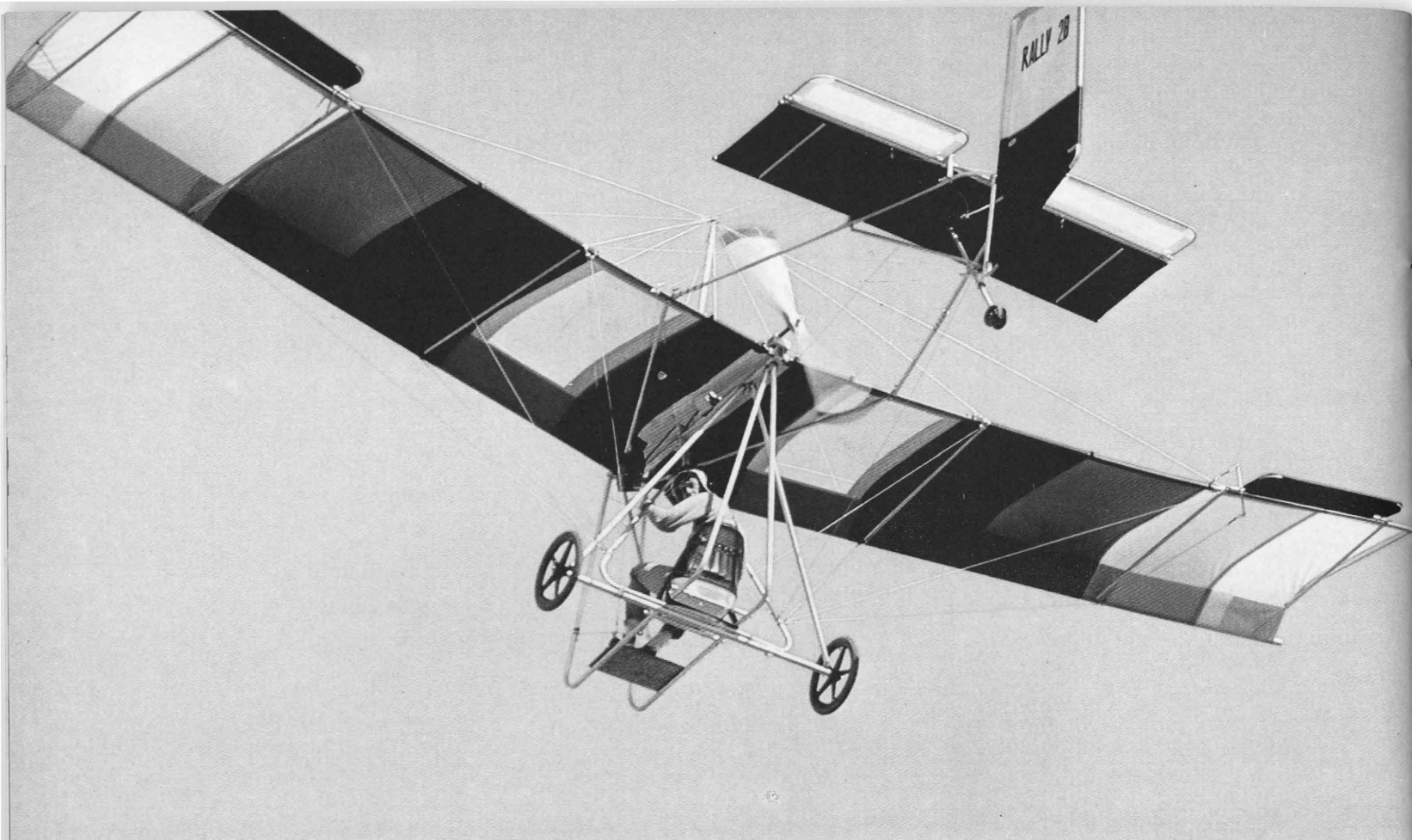
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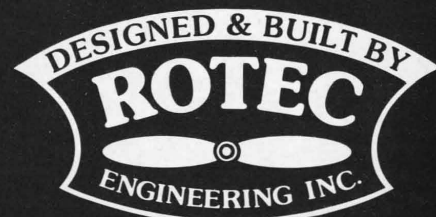
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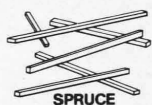
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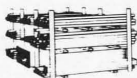
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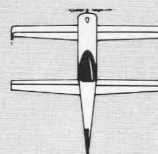
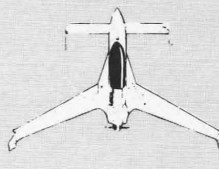
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